

Diurnal Temperatures in Dump-Stored Missiles

Part 2. Experimental Data

by

Richard D. Ulrich
for
Ordnance Systems Department

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NAVAL WEAPONS CENTER
CHINA LAKE, CA 93555-6001



Naval Weapons Center

FOREWORD

This report contains data related to the dump storage of ordnance; it includes a wide variety of dump-storage diurnal data from the desert environment, along with weather data for the same times. It is anticipated that these data will be used to calibrate computer models of the temperature response of items being stored in the outdoor environment.

This continuing effort has been sponsored by the Naval Air Systems Command under the Guided Missile Propulsion Technology Block Program (AirTask A32-320G/008B/WF31-330-000). Mr. Lee N. Gilbert is the NWC technology administrator for this program.

This report is being published in two parts; this part (Part 2) contains experimental data, along with weather data taken in conjunction with the analytical program that was reported in Part 1. The report, which was prepared by a consultant to the Naval Weapons Center, has been reviewed for technical accuracy by Howard C. Schafer and Crill Maples.

Approved by
M. E. ANDERSON, *Head*
Ordnance Systems Department
30 November 1988

Under authority of
J. A. BURT
Capt., USN
Commander

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INTRODUCTION

In the early 1970s, a project was undertaken in which three simple, analytical approaches for predicting specific temperature-time values were compared with experimentally obtained diurnal data. This involved not only the development of thermal analysis techniques and their application to the prediction of temperatures attained by dump-stored missiles, but also the gathering of thermal data for comparison with the calculations. This effort was reported in Part 1 of this report.

When the planned field tests were conducted for this project (at the Salt Wells facility of the Naval Weapons Center (NWC), which is located in the Mojave Desert of California), thermocouples were mounted on the specified missiles and shipping containers at the locations specified for the project and also at several additional locations on these missiles and containers, as well as a wide variety of additional ordnance. The additional thermocouples were mounted because this seemed a good opportunity to get extra data for future reference and for other applications. The measured thermal data are presented in this report, along with additional diurnal temperature data, for one day, from additional ordnance.

The specific objective of this part of the report is to document diurnal temperature data on some outdoor-stored (dump-stored) ordnance items for days during which weather data are available at the same location for the same time. Included also are data taken with the thermal standard device, which has been used extensively for gathering thermal data. (The thermal standard was developed by the authors for this purpose; listed in the bibliography are a number of reports describing the method. Part 1 of this report also contains a brief discussion.) Much data have been published over the years that involve temperatures of dump-stored ordnance, but not much that includes the specific daily (diurnal) temperature versus time results from thermocouples located in missiles and other types of military ordnance. Furthermore, only a small fraction of the published diurnal data includes synoptic weather data for the same locations. The primary use envisioned by the authors for the data published in this report is the calibration of computer models designed to calculate the temperature of dump-stored ordnance.

During the summer of 1974, the field tests were conducted, as planned, at NWC. The thermocouples were mounted on the missiles and shipping containers at the locations specified by the analysts and also at several additional locations on the missiles and shipping containers, as well as on a wide variety of other ordnance. The additional thermocouples were mounted because this seemed a good opportunity to get data for applications not necessarily related to the needs of these analysts. Also, very little diurnal data had been published, and this seemed to be a good method of getting additional data at little or no cost. These extra data are presented in this report, along with additional diurnal temperature data from China Lake taken at locations less than 200 feet from the primary site. Hourly diurnal data are given, some in tabular form and some in graphical form.

FIELD TEMPERATURE MEASUREMENTS

Temperature measurements for comparison with predictions were obtained on an AGM-45A-3 Shrike missile and an AIM-911-2 Sidewinder missile. Both missiles had operational guidance and control sections but inert warheads and rocket motors. Both missiles had a fresh coat of standard paint. Desert sand was used to simulate rocket motors, and a cast plastic was used to simulate warhead explosive, which was used in the Sidewinder. Both missiles were extensively instrumented with copper-constantan thermocouples. Details on the locations were provided in Part 1 of this report; they are summarized in Appendixes A through D of this volume. The missiles were tested in an all-up configuration, although wings and fins were not installed on the Shrike.

Tests were performed with the missiles both in and out of the shipping containers. The same two missiles were used for all the tests, which were made at different times of the summer. The Shrike containers consisted of a Mk 399 Mod 0, light navy gray, steel, single-store container and a three-missile container with a white acrylic top and gray aluminum bottom. The Sidewinder container was white acrylic and accommodated four missiles. During the tests with multistore containers, additional dummy stores were used to fill the container. The containers were also instrumented with thermocouples.

In addition to the ordnance temperatures, various environmental conditions were monitored for use in the predictions. Ambient air temperature was measured in a Stevenson shelter located about 100 feet from the missiles (Channel 9 on the data logger); wind speed and direction were measured at the test site and at the missile level; solar radiation as measured by a pyrliometer was obtained from the Range Instrumentation Support Division (located about 5 miles northwest of the test site); and relative humidity was monitored at the test site. The area was desert sand on the surface, and no special changes were made by way of surface conditioning or preparation.

Data were measured continuously throughout the summer of 1974 from early June to the middle of September. Also, the thermal standard data (five thermocouples: top, east side, west side, bottom, and center of the sphere) were monitored during the entire time. All the data were recorded on Honeywell Model 16 recorders.

The dates selected for analysis and the corresponding test configurations are listed in Table 1. These dates were chosen because these were cloudless days with relatively low winds and were deemed to be easier for analysis than other days. Also, the days chosen were similar in weather to the two or three preceding days and at least one following day. This ensured that no weather front passed by and caused a 1-day "glitch" in the long-term data. The recorded environmental conditions for these dates are listed in Table 2.

TABLE 1. Test Dates Selected for Analysis

| Date | Test configuration |
|-------------------|-------------------------------------|
| 12 June 1974 | Shrike out of container |
| 28 June 1974 | Shrike in single-store container |
| 29 August 1974 | Sidewinder out of container |
| 11 September 1974 | Shrike and Sidewinder in containers |

**TABLE 2. Weather Data for the Four Dates Used in the Analyses.
a. 12 June 1974.**

| Time | Wind, mph | Wind direction | Relative humidity, % | Air temperature, °F | Solar radiation, langley |
|------|--------------|----------------|-------------------------|------------------------|-----------------------------|
| 0000 | 1 | variable | 28 | 81 | --- |
| 0100 | 2 | variable | 28 | 81 | --- |
| 0200 | 2 | variable | 28 | 74 | --- |
| 0300 | 1 | variable | 30 | 71 | --- |
| 0400 | 1 | variable | 34 | 67 | --- |
| 0500 | 1 | variable | 38 | 67 | --- |
| 0600 | 1 | variable | 44 | 65 | 0.6 |
| 0700 | 1 | variable | 42 | 72 | 7.4 |
| 0800 | 2 | variable | 34 | 80 | 22.0 |
| 0900 | 2 | variable | 30 | 86 | 37.2 |
| 1000 | 3 | variable | 26 | 94 | 51.0 |
| 1100 | 3 | variable | 22 | 100 | 63.2 |
| 1200 | 3 | variable | 20 | 104 | 72.0 |
| 1300 | 4 | variable | 15 | 106 | 79.0 |
| 1400 | 4 | variable | 14 | 110 | 78.2 |
| 1500 | 5 | variable | 14 | 108 | 70.8 |
| 1600 | 4 | variable | 12 | 110 | 62.6 |
| 1700 | 3 | variable | 12 | 109 | 49.8 |
| 1800 | 5 | variable | 12 | 105 | 35.4 |
| 1900 | 5 | SW | 14 | 100 | 19.8 |
| 2000 | 4 | SW | 17 | 95 | 7.2 |
| 2100 | 4 | SW | 20 | 90 | 0.4 |
| 2200 | 4 | SW | 20 | 86 | --- |
| 2300 | 4 | SW | 25 | 83 | --- |

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TABLE 2. (Contd.)
b. 28 June 1974.

| Time | Wind, mph | Wind direction | Relative humidity, % | Air temperature, °F | Solar radiation, langleys |
|------|--------------|----------------|-------------------------|------------------------|------------------------------|
| 0000 | 2 | SW | 20 | 80 | --- |
| 0100 | 1 | SW | 20 | 77 | --- |
| 0200 | 2 | variable | 21 | 75 | --- |
| 0300 | 1 | SW | 22 | 70 | --- |
| 0400 | 1 | SW | 26 | 67 | --- |
| 0500 | 1 | SW | 33 | 59 | --- |
| 0600 | 1 | SW | 40 | 58 | 0.4 |
| 0700 | 1 | SW | 34 | 66 | 8.2 |
| 0800 | 2 | SW | 30 | 70 | 22.2 |
| 0900 | 2 | variable | 26 | 80 | 37.8 |
| 1000 | 2 | variable | 22 | 84 | 52.2 |
| 1100 | 3 | variable | 19 | 90 | 63.4 |
| 1200 | 3 | variable | 15 | 96 | 72.6 |
| 1300 | 4 | variable | 14 | 101 | 78.8 |
| 1400 | 3 | variable | 13 | 108 | 78.8 |
| 1500 | 4 | variable | 12 | 107 | 72.6 |
| 1600 | 3 | variable | 11 | 104 | 63.6 |
| 1700 | 4 | variable | 10 | 102 | 51.6 |
| 1800 | 3 | SW | 10 | 98 | 37.2 |
| 1900 | 2 | variable | 11 | 94 | 21.2 |
| 2000 | 2 | variable | 13 | 90 | 7.2 |
| 2100 | 3 | variable | 14 | 86 | 0.4 |
| 2200 | 3 | SW | 20 | 84 | --- |
| 2300 | 3 | SW | 22 | 83 | --- |

TABLE 2. (Contd.)
c. 29 August 1974.

| Time | Wind, mph | Wind direction | Relative humidity, % | Temperature, °F | Solar radiation, langley |
|------|--------------|----------------|----------------------|-----------------|-----------------------------|
| 0000 | 3 | S | 26 | 78 | --- |
| 0100 | 2 | S | 26 | 77 | --- |
| 0200 | 1 | S | 27 | 74 | --- |
| 0300 | 1 | S | 28 | 72 | --- |
| 0400 | 1 | SW | 30 | 70 | --- |
| 0500 | 0 | SW | 32 | 69 | --- |
| 0600 | 1 | SW | 33 | 65 | --- |
| 0700 | 0 | SW | 37 | 66 | 0.8 |
| 0800 | 1 | NW | 35 | 72 | 9.0 |
| 0900 | 2 | NW | 32 | 78 | 26.0 |
| 1000 | 1 | variable | 29 | 82 | 41.4 |
| 1100 | 2 | variable | 26 | 88 | 54.8 |
| 1200 | 2 | variable | 22 | 94 | 65.6 |
| 1300 | 3 | variable | 18 | 97 | 70.6 |
| 1400 | 3 | variable | 17 | 100 | 70.6 |
| 1500 | 3 | variable | 12 | 100 | 65.4 |
| 1600 | 4 | SW | 11 | 100 | 56.0 |
| 1700 | 2 | SW | 10 | 98 | 43.8 |
| 1800 | 2 | SW | 10 | 96 | 28.8 |
| 1900 | 2 | SW | 10 | 86 | 12.6 |
| 2000 | 3 | S | 13 | 80 | 1.0 |
| 2100 | 1 | SW | 15 | 76 | --- |
| 2200 | 1 | SW | 20 | 76 | --- |
| 2300 | 1 | variable | 24 | 70 | --- |

TABLE 2. (Contd.)
d. 11 September 1974.

| Time | Wind, mph | Wind direction | Relative humidity, % | Temperature, °F | Solar radiation, langleys |
|------|--------------|----------------|----------------------|-----------------|------------------------------|
| 0000 | 3 | SW | 21 | 78 | --- |
| 0100 | 3 | SW | 24 | 75 | --- |
| 0200 | 3 | SW | 24 | 75 | --- |
| 0300 | 2 | variable | 24 | 74 | --- |
| 0400 | 2 | variable | 28 | 68 | --- |
| 0500 | 2 | E | 30 | 64 | --- |
| 0600 | 1 | variable | 32 | 63 | --- |
| 0700 | 0 | variable | 32 | 64 | 0.2 |
| 0800 | 0 | SW | 30 | 70 | 7.8 |
| 0900 | 1 | variable | 29 | 79 | 21.8 |
| 1000 | 1 | variable | 25 | 85 | 37.2 |
| 1100 | 2 | variable | 22 | 92 | 51.0 |
| 1200 | 2 | variable | 20 | 95 | 61.2 |
| 1300 | 3 | variable | 19 | 97 | 65.8 |
| 1400 | 3 | variable | 18 | 100 | 65.4 |
| 1500 | 4 | variable | 16 | 102 | 60.4 |
| 1600 | 4 | variable | 16 | 102 | 50.4 |
| 1700 | 7 | S | 16 | 98 | 38.4 |
| 1800 | 4 | SW | 18 | 94 | 22.6 |
| 1900 | 4 | SW | 21 | 87 | 8.4 |
| 2000 | 4 | SW | 24 | 82 | 0.2 |
| 2100 | 4 | SW | 26 | 82 | --- |
| 2200 | 3 | SW | 26 | 80 | --- |
| 2300 | 2 | SW | 28 | 79 | --- |

Notes: Solar radiation is logged by weather facility using standard time.

All times are daylight saving time.

The correction for solar radiation time has been made.

SALT WELLS DIURNAL FIELD DATA

Some of the temperature data obtained from the Shrike and Sidewinder missiles and from the thermal standard during the 4 days listed in Table 1 are presented graphically in Appendixes A through D, along with identification of the data channels and thermocouple

locations. These data are presented without discussion, inasmuch as they are just the recorded results. All the results are not given graphically, but a wide diversity of size, thermal mass, color, etc., is provided.

As noted previously, additional data were gathered on a wide variety of other ordnance, including rockets, bombs, aircraft canopies, and ammunition. Table 3 gives hourly temperatures, in degrees Fahrenheit, obtained for more than 140 channels of data from thermocouples located on these ordnance items. (The left-hand column of the table gives the data channel, and the numbers across the top indicate the time of day.) The data given were taken on 12 June 1974. This day was chosen for the presentation of data in part because weather data have already been given (Table 2) and in part because 7 days in a row had similar temperature-versus-time-of-day values, so the comparative data would not be "abnormal." All of the temperatures recorded were taken within 150 feet of the weather data sensing and recording locations, except for the solar radiation. The channels and types of ordnance are identified in Table 4.

The data in the appendixes, plus those in Tables 3 and 4, should provide a sufficient amount of data that an analyst could probably match, or at least come close to, his particular problem.

These data, besides being useful in themselves for analysts, also illustrate the fact that one cannot expect to obtain 100% accurate comparisons between field and laboratory data. For example, Channels 40 through 44 and 74 through 79 of Table 3 provide data from two "identical" thermal standards. Comparing the results from these two thermal standards, one can see that, even when two nearly identical objects are instrumented and placed side by side outdoors, the temperatures vary by a few degrees. In just the brief period shown here, the maximum temperatures differ by as much as 14°F. The authors conclude from this that measured temperature differences of 5 or 6 degrees are not of significance when objects are stored in outdoor situations. This is true under controlled conditions. When uncontrolled variables are considered (such as paint aging, surface scratches, random directions relative to north, oxidation, thermocouple attachment method, cloud cover, local wind effects, etc.), one would be unsure of his ability to predict the temperature difference between an object and the ambient air to within 15 or 20°F.

TABLE 3. Temperature Data, in Degrees Fahrenheit, for a 24-Hour Period, 12 June 1974.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|----|-----|-----|-----|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 82 | 78 | 74 | 71 | 69 | 67 | 69 | 91 | 109 | 120 | 125 | 126 | 124 | 124 | 123 | 121 | 123 | 120 | 116 | 110 | 101 | 95 | 89 | 87 |
| 2 | 80 | 76 | 73 | 70 | 67 | 66 | 66 | 75 | 90 | 104 | 116 | 126 | 131 | 135 | 135 | 136 | 139 | 136 | 129 | 118 | 105 | 97 | 90 | 87 |
| 3 | 82 | 77 | 74 | 70 | 68 | 66 | 66 | 72 | 85 | 99 | 112 | 123 | 130 | 134 | 136 | 136 | 138 | 137 | 130 | 122 | 109 | 99 | 92 | 88 |
| 4 | 76 | 72 | 69 | 65 | 63 | 62 | 66 | 84 | 101 | 116 | 129 | 138 | 141 | 147 | 138 | 139 | 147 | 132 | 122 | 108 | 95 | 89 | 84 | 82 |
| 5 | 86 | 84 | 80 | 78 | 75 | 73 | 72 | 74 | 79 | 85 | 92 | 96 | 101 | 104 | 106 | 107 | 108 | 107 | 106 | 104 | 101 | 97 | 95 | 91 |
| 6 | 93 | 91 | 88 | 85 | 82 | 79 | 77 | 76 | 76 | 79 | 82 | 86 | 89 | 95 | 98 | 101 | 104 | 104 | 105 | 105 | 104 | 103 | 101 | 98 |
| 7 | 86 | 83 | 80 | 78 | 75 | 73 | 72 | 73 | 78 | 84 | 90 | 95 | 100 | 104 | 107 | 109 | 110 | 109 | 107 | 105 | 101 | 98 | 95 | 92 |
| 8 | 76 | 72 | 70 | 67 | 65 | 63 | 62 | 70 | 80 | 89 | 98 | 106 | 113 | 118 | 119 | 120 | 121 | 115 | 109 | 100 | 93 | 88 | 83 | 82 |
| 9 | 83 | 78 | 75 | 72 | 70 | 70 | 70 | 78 | 85 | 90 | 95 | 100 | 104 | 107 | 109 | 110 | 112 | 108 | 107 | 103 | 98 | 94 | 88 | 88 |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 84 | 79 | 76 | 73 | 70 | 68 | 67 | 73 | 86 | 99 | 109 | 118 | 124 | 127 | 130 | 130 | 131 | 130 | 121 | 115 | 107 | 101 | 94 | 91 |
| 15 | 88 | 84 | 80 | 77 | 73 | 71 | 70 | 71 | 78 | 88 | 97 | 107 | 113 | 117 | 121 | 124 | 127 | 129 | 123 | 118 | 110 | 104 | 98 | 94 |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | 80 | 77 | 73 | 70 | 68 | 66 | 66 | 75 | 89 | 104 | 117 | 125 | 129 | 130 | 133 | 137 | 142 | 138 | 122 | 116 | 104 | 97 | 91 | 86 |
| 18 | 95 | 93 | 90 | 87 | 85 | 82 | 79 | 78 | 77 | 79 | 82 | 86 | 90 | 94 | 98 | 101 | 104 | 107 | 109 | 109 | 107 | 104 | 101 | 98 |
| 19 | 92 | 89 | 86 | 84 | 81 | 78 | 76 | 75 | 77 | 82 | 88 | 95 | 101 | 107 | 112 | 115 | 116 | 117 | 115 | 113 | 108 | 104 | 100 | 96 |
| 20 | 81 | 76 | 73 | 69 | 68 | 66 | 69 | 85 | 101 | 113 | 125 | 131 | 135 | 139 | 139 | 141 | 138 | 132 | 122 | 116 | 105 | 98 | 90 | 87 |
| 21 | 85 | 81 | 77 | 73 | 70 | 68 | 79 | 77 | 90 | 102 | 113 | 120 | 124 | 126 | 127 | 129 | 131 | 129 | 123 | 119 | 110 | 103 | 97 | 91 |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 106 | 104 | 102 | 100 | 98 | 96 | 94 | 92 | 92 | 92 | 94 | 96 | 98 | 101 | 104 | 107 | 108 | 111 | 112 | 113 | 113 | 113 | 111 | 110 |
| 26 | 97 | 94 | 91 | 89 | 87 | 85 | 83 | 85 | 92 | 99 | 106 | 110 | 114 | 118 | 119 | 120 | 121 | 121 | 119 | 117 | 113 | 109 | 106 | 102 |
| 27 | 90 | 86 | 83 | 81 | 78 | 77 | 77 | 85 | 99 | 111 | 120 | 126 | 131 | 134 | 135 | 134 | 134 | 131 | 125 | 118 | 109 | 104 | 99 | 95 |
| 28 | 78 | 74 | 71 | 69 | 68 | 66 | 68 | 92 | 117 | 134 | 146 | 154 | 157 | 165 | 153 | 151 | 154 | 139 | 125 | 109 | 97 | 92 | 86 | 84 |
| 29 | 75 | 71 | 68 | 65 | 63 | 62 | 65 | 95 | 124 | 143 | 154 | 162 | 161 | 167 | 151 | 147 | 147 | 129 | 116 | 104 | 93 | 88 | 83 | 81 |
| 30 | 76 | 71 | 68 | 65 | 63 | 62 | 63 | 93 | 117 | 135 | 147 | 155 | 157 | 167 | 156 | 153 | 154 | 138 | 124 | 107 | 94 | 88 | 83 | 82 |
| 31 | 101 | 97 | 94 | 90 | 87 | 83 | 81 | 80 | 82 | 86 | 91 | 97 | 103 | 108 | 114 | 118 | 121 | 125 | 126 | 126 | 123 | 118 | 113 | 109 |
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| 35 | 88 | 85 | 81 | 78 | 75 | 73 | 72 | 85 | 99 | 110 | 119 | 126 | 131 | 136 | 137 | 137 | 139 | 135 | 129 | 121 | 110 | 104 | 99 | 95 |
| 36 | 82 | 75 | 74 | 70 | 69 | 68 | 68 | 72 | 81 | 88 | 96 | 104 | 108 | 116 | 119 | 122 | 124 | 125 | 119 | 111 | 99 | 94 | 87 | 87 |
| 37 | 88 | 85 | 81 | 78 | 74 | 72 | 70 | 69 | 72 | 78 | 85 | 92 | 99 | 105 | 110 | 112 | 114 | 116 | 116 | 113 | 110 | 104 | 99 | 95 |
| 38 | 77 | 73 | 70 | 67 | 65 | 63 | 64 | 72 | 84 | 96 | 106 | 115 | 120 | 125 | 123 | 121 | 121 | 116 | 110 | 103 | 95 | 90 | 85 | 83 |
| 39 | 80 | 76 | 73 | 70 | 68 | 67 | 70 | 80 | 92 | 100 | 106 | 111 | 113 | 116 | 113 | 113 | 113 | 112 | 108 | 104 | 98 | 93 | 88 | 86 |
| 40 | 88 | 84 | 81 | 77 | 74 | 72 | 71 | 75 | 85 | 94 | 102 | 109 | 115 | 119 | 122 | 123 | 125 | 126 | 123 | 118 | 110 | 103 | 97 | 92 |
| 41 | 84 | 79 | 78 | 72 | 73 | 71 | 73 | 86 | 104 | 118 | 130 | 139 | 144 | 150 | 144 | 141 | 143 | 133 | 122 | 112 | 101 | 96 | 90 | 88 |
| 42 | 84 | 80 | 76 | 73 | 70 | 69 | 72 | 100 | 114 | 125 | 127 | 129 | 126 | 127 | 121 | 121 | 123 | 119 | 114 | 107 | 100 | 95 | 99 | 88 |
| 43 | 88 | 79 | 79 | 73 | 74 | 72 | 73 | 83 | 95 | 104 | 108 | 116 | 118 | 124 | 123 | 123 | 127 | 122 | 118 | 110 | 101 | 96 | 91 | 89 |
| 44 | 84 | 80 | 76 | 73 | 71 | 69 | 70 | 78 | 89 | 101 | 110 | 121 | 130 | 137 | 139 | 141 | 148 | 135 | 125 | 112 | 102 | 95 | 91 | 88 |
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| 64 | | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | 84 | 78 | 76 | 72 | 71 | 69 | 72 | 86 | 102 | 116 | 126 | 136 | 141 | 145 | 144 | 142 | 142 | 136 | 125 | 116 | 105 | 98 | 91 | 88 |
| 66 | 84 | 78 | 76 | 73 | 71 | 70 | 76 | 102 | 118 | 129 | 133 | 138 | 135 | 137 | 128 | 126 | 126 | 123 | 116 | 110 | 103 | 97 | 90 | 88 |
| 67 | 105 | 87 | 91 | 70 | 85 | 74 | 84 | 91 | 118 | 115 | 122 | 126 | 125 | 138 | 140 | 135 | 136 | 140 | 138 | 127 | 116 | 110 | 103 | 103 |
| 68 | 88 | 83 | 80 | 77 | 74 | 72 | 70 | 75 | 87 | 100 | 110 | 118 | 125 | 130 | 133 | 134 | 133 | 135 | 129 | 122 | 114 | 105 | 97 | 93 |
| 69 | 85 | 78 | 78 | 73 | 73 | 71 | 72 | 80 | 92 | 102 | 112 | 122 | 129 | 141 | 147 | 150 | 156 | 149 | 137 | 123 | 105 | 98 | 90 | 89 |
| 70 | 77 | 71 | 71 | 68 | 68 | 66 | 68 | 83 | 101 | 117 | 131 | 142 | 147 | 151 | 147 | 142 | 137 | 125 | 112 | 99 | 92 | 87 | 81 | 81 |
| 71 | | | | | | | | | | | | | | | | | | | | | | | | |

Note: Left column lists the data channel number. Remaining column headings list the time of day.

TABLE 3. (Contd.)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 72 | | | | | | | | | | | | | | | | | | | | | | | | |
| 73 | | | | | | | | | | | | | | | | | | | | | | | | |
| 74 | 88 | 77 | 80 | 72 | 74 | 73 | 76 | 88 | 104 | 117 | 127 | 137 | 140 | 146 | 141 | 139 | 140 | 132 | 121 | 112 | 101 | 96 | 89 | 88 |
| 75 | 87 | 79 | 79 | 73 | 73 | 72 | 75 | 87 | 103 | 113 | 121 | 131 | 134 | 137 | 126 | 123 | 127 | 120 | 113 | 108 | 101 | 96 | 91 | 88 |
| 76 | 88 | 79 | 80 | 73 | 74 | 73 | 76 | 84 | 95 | 100 | 103 | 110 | 109 | 118 | 118 | 119 | 119 | 122 | 116 | 113 | 104 | 98 | 88 | 91 |
| 77 | 88 | 78 | 80 | 73 | 74 | 73 | 76 | 84 | 94 | 101 | 109 | 114 | 116 | 123 | 124 | 126 | 132 | 131 | 124 | 116 | 102 | 97 | 90 | 88 |
| 78 | 79 | 77 | 74 | 72 | 71 | 70 | 69 | 72 | 76 | 81 | 86 | 92 | 95 | 98 | 99 | 99 | 98 | 97 | 94 | 89 | 84 | 79 | 77 | 75 |
| 79 | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | | | | | | | | | | | | | |
| 81 | 78 | 74 | 71 | 68 | 66 | 65 | 68 | 78 | 88 | 98 | 104 | 109 | 112 | 117 | 118 | 119 | 120 | 118 | 113 | 105 | 96 | 91 | 86 | 83 |
| 82 | 78 | 73 | 70 | 67 | 65 | 63 | 68 | 80 | 91 | 100 | 107 | 111 | 113 | 117 | 117 | 117 | 115 | 110 | 103 | 95 | 90 | 85 | 82 | |
| 83 | 80 | 76 | 73 | 70 | 67 | 65 | 65 | 71 | 81 | 91 | 99 | 106 | 111 | 115 | 118 | 119 | 120 | 119 | 116 | 110 | 101 | 95 | 89 | 85 |
| 84 | 80 | 76 | 73 | 70 | 67 | 65 | 65 | 71 | 81 | 91 | 99 | 106 | 111 | 115 | 118 | 120 | 121 | 121 | 117 | 111 | 101 | 95 | 89 | 85 |
| 85 | 80 | 76 | 73 | 70 | 67 | 65 | 66 | 72 | 82 | 92 | 99 | 106 | 110 | 115 | 118 | 119 | 120 | 120 | 116 | 110 | 101 | 95 | 89 | 85 |
| 86 | 80 | 76 | 73 | 70 | 68 | 65 | 66 | 73 | 82 | 92 | 100 | 107 | 111 | 115 | 118 | 118 | 119 | 119 | 116 | 110 | 101 | 95 | 89 | 85 |
| 87 | 79 | 76 | 73 | 70 | 67 | 65 | 65 | 72 | 82 | 92 | 100 | 106 | 110 | 114 | 117 | 118 | 119 | 119 | 115 | 109 | 100 | 94 | 88 | 85 |
| 88 | 80 | 77 | 73 | 70 | 68 | 65 | 65 | 71 | 81 | 91 | 99 | 106 | 110 | 115 | 117 | 118 | 120 | 120 | 116 | 111 | 102 | 95 | 90 | 85 |
| 89 | 82 | 78 | 75 | 71 | 69 | 67 | 66 | 71 | 80 | 88 | 97 | 104 | 109 | 114 | 117 | 118 | 119 | 120 | 116 | 112 | 103 | 97 | 91 | 87 |
| 90 | 79 | 75 | 72 | 69 | 67 | 65 | 65 | 72 | 82 | 92 | 100 | 107 | 111 | 115 | 117 | 118 | 119 | 118 | 115 | 109 | 100 | 94 | 88 | 85 |
| 91 | 78 | 73 | 71 | 68 | 66 | 63 | 78 | 98 | 111 | 119 | 123 | 123 | 120 | 121 | 119 | 118 | 118 | 115 | 110 | 104 | 96 | 90 | 86 | 83 |
| 92 | 78 | 74 | 71 | 68 | 66 | 65 | 72 | 88 | 101 | 110 | 114 | 117 | 117 | 120 | 118 | 118 | 118 | 116 | 112 | 105 | 97 | 92 | 87 | 83 |
| 93 | 78 | 73 | 71 | 68 | 66 | 64 | 66 | 76 | 86 | 95 | 103 | 110 | 114 | 121 | 127 | 134 | 139 | 138 | 130 | 112 | 96 | 91 | 86 | 83 |
| 94 | 78 | 74 | 71 | 68 | 66 | 65 | 66 | 74 | 85 | 94 | 102 | 108 | 113 | 120 | 124 | 128 | 131 | 131 | 124 | 111 | 97 | 92 | 86 | 83 |
| 95 | 80 | 75 | 73 | 69 | 67 | 65 | 67 | 76 | 87 | 96 | 103 | 110 | 113 | 116 | 116 | 115 | 115 | 113 | 109 | 104 | 98 | 93 | 88 | 85 |
| 96 | 79 | 76 | 73 | 70 | 67 | 65 | 65 | 70 | 78 | 87 | 96 | 104 | 111 | 116 | 120 | 121 | 123 | 120 | 115 | 108 | 98 | 93 | 88 | 85 |
| 97 | 82 | 79 | 75 | 72 | 70 | 68 | 67 | 72 | 79 | 87 | 95 | 101 | 107 | 113 | 116 | 118 | 121 | 120 | 117 | 111 | 101 | 96 | 91 | 87 |
| 98 | 82 | 79 | 75 | 72 | 70 | 68 | 69 | 76 | 85 | 92 | 99 | 105 | 109 | 113 | 113 | 114 | 116 | 114 | 111 | 108 | 101 | 96 | 91 | 87 |
| 99 | 88 | 84 | 81 | 77 | 74 | 71 | 70 | 70 | 73 | 80 | 86 | 93 | 99 | 104 | 109 | 112 | 114 | 116 | 115 | 113 | 110 | 104 | 99 | 95 |
| 100 | 87 | 83 | 80 | 76 | 73 | 70 | 68 | 69 | 73 | 79 | 86 | 94 | 100 | 105 | 110 | 113 | 114 | 116 | 115 | 113 | 109 | 104 | 98 | 94 |
| 101 | 88 | 84 | 81 | 77 | 74 | 71 | 69 | 68 | 70 | 76 | 83 | 90 | 98 | 104 | 110 | 113 | 116 | 118 | 118 | 116 | 111 | 105 | 99 | 95 |
| 102 | 88 | 84 | 81 | 77 | 74 | 71 | 69 | 69 | 72 | 77 | 84 | 91 | 98 | 104 | 109 | 113 | 116 | 118 | 118 | 116 | 111 | 105 | 99 | 95 |
| 103 | 90 | 86 | 82 | 79 | 75 | 73 | 70 | 69 | 70 | 75 | 81 | 88 | 95 | 101 | 107 | 111 | 114 | 116 | 117 | 116 | 113 | 107 | 102 | 97 |
| 104 | 90 | 86 | 82 | 78 | 75 | 72 | 70 | 69 | 70 | 75 | 82 | 88 | 95 | 102 | 107 | 111 | 114 | 116 | 117 | 116 | 113 | 107 | 102 | 97 |
| 105 | 75 | 71 | 68 | 65 | 61 | 60 | 63 | 77 | 90 | 103 | 113 | 119 | 123 | 129 | 126 | 124 | 124 | 117 | 110 | 102 | 93 | 88 | 83 | 80 |
| 106 | 82 | 78 | 75 | 72 | 69 | 67 | 67 | 73 | 83 | 92 | 101 | 107 | 113 | 118 | 121 | 122 | 124 | 123 | 119 | 113 | 104 | 98 | 92 | 88 |
| 107 | 82 | 78 | 74 | 71 | 69 | 66 | 67 | 74 | 84 | 94 | 102 | 109 | 114 | 117 | 119 | 119 | 120 | 119 | 116 | 112 | 103 | 96 | 91 | 87 |
| 108 | 85 | 82 | 78 | 75 | 72 | 70 | 68 | 70 | 77 | 85 | 93 | 100 | 107 | 112 | 116 | 118 | 120 | 121 | 119 | 116 | 108 | 102 | 96 | 92 |
| 109 | 76 | 72 | 70 | 66 | 63 | 61 | 62 | 71 | 79 | 91 | 101 | 110 | 117 | 124 | 124 | 125 | 126 | 120 | 113 | 105 | 95 | 89 | 85 | 82 |
| 110 | 76 | 72 | 70 | 66 | 63 | 61 | 67 | 80 | 92 | 103 | 111 | 117 | 120 | 123 | 119 | 117 | 115 | 110 | 106 | 101 | 94 | 89 | 84 | 82 |
| 111 | 80 | 76 | 72 | 70 | 68 | 66 | 72 | 85 | 96 | 104 | 110 | 113 | 114 | 116 | 114 | 113 | 112 | 110 | 106 | 102 | 97 | 92 | 88 | 85 |
| 112 | 84 | 81 | 78 | 74 | 72 | 70 | 71 | 78 | 87 | 96 | 103 | 109 | 113 | 116 | 118 | 119 | 122 | 118 | 114 | 109 | 101 | 96 | 92 | 89 |
| 113 | 80 | 76 | 73 | 70 | 68 | 66 | 66 | 70 | 77 | 84 | 92 | 100 | 108 | 116 | 121 | 125 | 130 | 127 | 121 | 111 | 98 | 92 | 88 | 85 |
| 114 | 88 | 85 | 81 | 78 | 74 | 72 | 70 | 69 | 70 | 75 | 81 | 88 | 96 | 104 | 110 | 116 | 119 | 121 | 121 | 119 | 113 | 106 | 101 | 95 |
| 115 | 86 | 82 | 79 | 75 | 73 | 70 | 68 | 69 | 74 | 81 | 88 | 96 | 103 | 109 | 113 | 116 | 117 | 117 | 116 | 113 | 108 | 103 | 98 | 93 |
| 116 | 88 | 85 | 82 | 78 | 75 | 72 | 70 | 71 | 76 | 83 | 90 | 96 | 102 | 107 | 110 | 113 | 114 | 115 | 114 | 113 | 109 | 105 | 100 | 95 |
| 117 | 91 | 87 | 83 | 80 | 77 | 74 | 72 | 71 | 74 | 80 | 87 | 94 | 100 | 106 | 110 | 114 | 116 | 118 | 118 | 116 | 112 | 107 | 102 | 97 |
| 118 | 91 | 87 | 83 | 80 | 77 | 73 | 71 | 70 | 72 | 77 | 83 | 90 | 97 | 104 | 109 | 113 | 115 | 117 | 118 | 116 | 113 | 108 | 103 | 98 |
| 119 | | | | | | | | | | | | | | | | | | | | | | | | |
| 120 | | | | | | | | | | | | | | | | | | | | | | | | |
| 121 | | | | | | | | | | | | | | | | | | | | | | | | |
| 122 | | | | | | | | | | | | | | | | | | | | | | | | |
| 123 | | | | | | | | | | | | | | | | | | | | | | | | |
| 124 | | | | | | | | | | | | | | | | | | | | | | | | |
| 125 | 85 | 81 | 79 | 76 | 74 | 73 | 73 | 78 | 83 | 88 | 93 | 98 | 103 | 108 | 108 | 111 | 119 | 114 | 110 | 103 | 96 | 95 | 88 | 87 |
| 126 | 90 | 86 | 86 | 81 | 81 | 79 | 76 | 75 | 78 | 79 | 83 | 90 | 93 | 101 | 103 | 104 | 106 | 111 | 109 | 107 | 102 | 102 | 95 | 94 |
| 127 | 84 | 81 | 78 | 75 | 85 | 82 | 83 | 76 | 83 | 85 | 88 | 96 | 101 | 95 | 95 | 98 | 101 | 102 | 103 | 100 | 97 | 98 | 95 | 92 |
| 128 | 85 | 80 | 78 | 74 | 73 | 71 | 71 | 78 | 90 | 101 | 112 | 122 | 129 | 136 | 137 | 136 | 138 | 138 | 129 | 118 | 106 | 101 | 92 | 89 |
| 129 | 89 | 85 | 82 | 79 | 77 | 74 | 73 | 77 | 86 | 96 | 107 | 116 | 123 | 129 | 131 | 132 | 135 | 135 | 128 | 119 | 108 | 104 | 98 | 93 |
| 130 | 86 | 82 | 80 | 76 | 73 | 72 | 70 | 75 | 86 | 97 | 109 | 119 | 127 | 134 | 137 | 138 | 140 | 141 | 132 | 123 | 110 | 104 | 96 | 91 |
| 131 | 78 | 76 | 73 | 69 | 70 | 70 | 67 | 70 | 80 | 88 | 95 | 104 | 107 | 114 | 113 | 113 | 114 | 112 | 114 | 99 | 88 | 83 | 80 | 77 |
| 132 | 78 | 86 | 85 | 81 | 88 | 80 | 70 | 78 | 81 | 94 | 113 | 117 | 137 | 123 | 123 | 137 | 150 | 128 | 124 | 111 | 95 | 89 | 99 | 81 |
| 133 | 84 | 80 | 78 | 73 | 72 | 70 | 70 | 78 | 90 | 101 | 113 | 124 | 132 | 140 | 140 | 140 | 145 | 140 | 131 | 119 | 105 | 100 | 92 | 88 |
| 134 | 86 | 82 | 79 | 76 | 73 | 71 | 70 | 75 | 85 | 96 | 107 | 118 | 127 | 133 | 137 | 137 | 141 | 140 | 131 | 121 | 107 | 102 | 95 | 90 |
| 135 | 92 | 86 | 85 | 80 | 77 | 76 | 72 | 76 | 88 | 95 | 108 | 118 | 123 | 134 | 139 | 139 | 139 | 148 | 136 | 131 | 118 | 111 | 97 | 98 |
| 136 | 88 | 84 | 81 | 78 | 75 | 73 | 72 | 78 | 87 | 98 | 109 | 119 | 128 | 134 | 137 | 138 | 143 | 142 | 134 | 123 | 110 | 104 | 97 | 92 |
| 137 | 84 | 80 | 78 | 74 | 72 | 70 | 70 | 76 | 88 | 100 | 112 | 121 | 129 | 135 | 137 | 137 | 136 | 129 | 126 | 117 | 104 | 97 | 90 | 86 |
| 138 | 87 | 80 | 82 | 74 | 75 | 73 | 70 | 75 | 87 | 98 | 107 | 119 | 124 | 136 | 138 | 136 | 137 | 142 | 131 | 123 | 110 | 106 | 93 | 92 |
| 139 | 90 | 84 | 85 | 78 | 78 | 77 | 74 | 78 | 90 | 100 | 108 | 120 | 124 | 135 | 138 | 136 | 138 | | | | | | | |

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TABLE 3. (Contd.)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-----|-----|-----|-----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 143 | 83 | 80 | 77 | 73 | 71 | 70 | 69 | 75 | 87 | 99 | 112 | 123 | 134 | 142 | 145 | 145 | 150 | 143 | 130 | 119 | 105 | 100 | 92 | 88 |
| 144 | 84 | 81 | 78 | 74 | 72 | 70 | 70 | 78 | 88 | 100 | 113 | 124 | 135 | 142 | 144 | 144 | 148 | 144 | 131 | 120 | 106 | 101 | 93 | 88 |
| 145 | 87 | 82 | 80 | 75 | 73 | 71 | 69 | 74 | 87 | 101 | 116 | 131 | 141 | 150 | 153 | 151 | 151 | 152 | 141 | 131 | 116 | 108 | 97 | 93 |
| 146 | 88 | 82 | 80 | 75 | 73 | 71 | 69 | 74 | 88 | 102 | 118 | 133 | 143 | 152 | 157 | 155 | 155 | 156 | 145 | 134 | 118 | 110 | 98 | 93 |
| 147 | 85 | 82 | 78 | 75 | 72 | 69 | 68 | 76 | 92 | 109 | 126 | 139 | 150 | 155 | 159 | 158 | 160 | 157 | 146 | 133 | 116 | 106 | 97 | 91 |
| 148 | 85 | 82 | 78 | 75 | 72 | 70 | 69 | 75 | 87 | 102 | 118 | 132 | 143 | 150 | 152 | 150 | 152 | 150 | 141 | 128 | 113 | 106 | 97 | 91 |
| 149 | 86 | 82 | 78 | 75 | 72 | 70 | 69 | 75 | 88 | 104 | 120 | 134 | 145 | 152 | 155 | 154 | 156 | 153 | 144 | 131 | 116 | 107 | 98 | 92 |
| 150 | 85 | 81 | 78 | 74 | 72 | 69 | 69 | 76 | 93 | 109 | 126 | 139 | 149 | 155 | 158 | 157 | 160 | 157 | 146 | 132 | 115 | 106 | 97 | 91 |
| 151 | 83 | 79 | 76 | 73 | 70 | 68 | 68 | 78 | 92 | 108 | 123 | 135 | 145 | 150 | 151 | 150 | 152 | 150 | 139 | 126 | 110 | 103 | 95 | 88 |
| 152 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 165 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 153 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 165 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 154 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 164 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 155 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 165 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 156 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 164 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 157 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 164 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 158 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 164 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 159 | 84 | 80 | 77 | 73 | 71 | 68 | 69 | 79 | 95 | 113 | 131 | 145 | 155 | 163 | 164 | 163 | 167 | 163 | 150 | 133 | 113 | 104 | 95 | 89 |
| 160 | 85 | 82 | 79 | 76 | 73 | 71 | 70 | 70 | 75 | 83 | 92 | 103 | 112 | 117 | 118 | 117 | 118 | 117 | 112 | 107 | 100 | 97 | 92 | 88 |
| 161 | 86 | 83 | 80 | 77 | 73 | 71 | 70 | 70 | 75 | 82 | 92 | 103 | 113 | 121 | 123 | 119 | 121 | 121 | 113 | 108 | 101 | 98 | 93 | 88 |
| 162 | 80 | 78 | 76 | 72 | 70 | 69 | 69 | 74 | 89 | 101 | 109 | 115 | 124 | 119 | 113 | 109 | 118 | 110 | 107 | 102 | 96 | 95 | 88 | 85 |
| 163 | 83 | 78 | 78 | 72 | 71 | 70 | 66 | 68 | 80 | 93 | 113 | 132 | 134 | 132 | 117 | 112 | 116 | 118 | 110 | 110 | 100 | 97 | 87 | 87 |
| 164 | 80 | 78 | 74 | 72 | 70 | 68 | 69 | 77 | 89 | 101 | 110 | 116 | 120 | 121 | 119 | 120 | 116 | 110 | 104 | 96 | 94 | 88 | 85 | 85 |
| 165 | 82 | 79 | 76 | 73 | 70 | 68 | 69 | 80 | 95 | 108 | 116 | 122 | 124 | 126 | 121 | 122 | 124 | 122 | 116 | 109 | 99 | 95 | 89 | 85 |
| 166 | 83 | 79 | 76 | 73 | 70 | 68 | 73 | 88 | 94 | 100 | 107 | 111 | 114 | 120 | 119 | 125 | 130 | 128 | 120 | 114 | 101 | 96 | 90 | 85 |
| 167 | 83 | 79 | 76 | 73 | 70 | 68 | 72 | 82 | 93 | 101 | 110 | 114 | 116 | 122 | 119 | 126 | 135 | 132 | 123 | 115 | 100 | 96 | 90 | 85 |
| 168 | 83 | 79 | 76 | 73 | 70 | 68 | 69 | 78 | 91 | 101 | 110 | 113 | 116 | 118 | 117 | 120 | 125 | 123 | 116 | 110 | 100 | 96 | 90 | 86 |
| 169 | 85 | 81 | 78 | 75 | 73 | 70 | 70 | 73 | 79 | 85 | 93 | 101 | 107 | 112 | 118 | 123 | 128 | 129 | 124 | 115 | 101 | 97 | 92 | 87 |
| 170 | 85 | 82 | 78 | 75 | 72 | 70 | 70 | 78 | 89 | 99 | 106 | 111 | 116 | 116 | 117 | 118 | 121 | 117 | 110 | 105 | 98 | 96 | 92 | 87 |
| 171 | 84 | 83 | 76 | 76 | 71 | 68 | 70 | 79 | 88 | 98 | 106 | 110 | 117 | 115 | 115 | 109 | 123 | 117 | 110 | 104 | 97 | 95 | 92 | 86 |
| 172 | 84 | 78 | 78 | 72 | 73 | 71 | 70 | 85 | 107 | 115 | 120 | 126 | 127 | 132 | 130 | 125 | 133 | 131 | 122 | 115 | 101 | 98 | 88 | 86 |
| 173 | 81 | 78 | 75 | 72 | 70 | 69 | 68 | 85 | 102 | 114 | 119 | 125 | 128 | 129 | 127 | 125 | 132 | 129 | 121 | 114 | 98 | 95 | 88 | 85 |
| 174 | 81 | 78 | 73 | 73 | 69 | 68 | 68 | 85 | 102 | 114 | 119 | 125 | 129 | 129 | 125 | 125 | 132 | 128 | 119 | 113 | 97 | 93 | 88 | 84 |
| 175 | 84 | 81 | 77 | 74 | 71 | 69 | 70 | 73 | 78 | 85 | 92 | 99 | 108 | 113 | 121 | 127 | 135 | 133 | 127 | 116 | 100 | 96 | 91 | 86 |
| 176 | 78 | 74 | 72 | 68 | 68 | 67 | 70 | 82 | 96 | 103 | 110 | 116 | 118 | 123 | 122 | 122 | 134 | 121 | 114 | 104 | 95 | 92 | 85 | 83 |
| 177 | 97 | 95 | 92 | 89 | 86 | 83 | 82 | 81 | 83 | 86 | 90 | 93 | 96 | 98 | 100 | 102 | 107 | 110 | 112 | 110 | 108 | 108 | 105 | 101 |
| 178 | 95 | 92 | 88 | 86 | 83 | 80 | 78 | 79 | 82 | 86 | 90 | 95 | 98 | 101 | 104 | 106 | 112 | 114 | 114 | 112 | 108 | 107 | 104 | 100 |
| 179 | | | | | | | | | | | | | | | | | | | | | | | | |
| 180 | 98 | 95 | 92 | 87 | 85 | 82 | 78 | 77 | 78 | 81 | 87 | 94 | 101 | 109 | 113 | 118 | 123 | 129 | 129 | 127 | 121 | 117 | 109 | 103 |
| 181 | 91 | 90 | 85 | 85 | 81 | 78 | 78 | 78 | 78 | 82 | 86 | 89 | 95 | 96 | 99 | 103 | 105 | 104 | 106 | 104 | 102 | 99 | 98 | 95 |
| 182 | 88 | 85 | 83 | 81 | 78 | 76 | 75 | 76 | 78 | 83 | 88 | 93 | 98 | 101 | 105 | 107 | 107 | 108 | 107 | 104 | 100 | 97 | 94 | 91 |
| 183 | 92 | 89 | 86 | 83 | 81 | 78 | 78 | 83 | 92 | 101 | 111 | 120 | 125 | 129 | 129 | 128 | 128 | 125 | 121 | 116 | 109 | 104 | 99 | 96 |
| 184 | 95 | 92 | 88 | 86 | 83 | 80 | 78 | 80 | 84 | 91 | 99 | 107 | 116 | 121 | 125 | 128 | 130 | 130 | 126 | 122 | 115 | 108 | 104 | 100 |
| 185 | 92 | 90 | 86 | 84 | 81 | 78 | 78 | 83 | 91 | 101 | 110 | 117 | 123 | 124 | 125 | 124 | 125 | 123 | 119 | 116 | 109 | 104 | 100 | 96 |
| 186 | 95 | 92 | 89 | 85 | 83 | 80 | 78 | 79 | 82 | 88 | 95 | 104 | 111 | 118 | 123 | 127 | 130 | 132 | 130 | 126 | 116 | 110 | 104 | 100 |
| 187 | | | | | | | | | | | | | | | | | | | | | | | | |
| 188 | | | | | | | | | | | | | | | | | | | | | | | | |
| 189 | 105 | 103 | 100 | 98 | 95 | 93 | 91 | 89 | 87 | 87 | 88 | 89 | 93 | 97 | 101 | 105 | 109 | 112 | 114 | 115 | 114 | 113 | 111 | 108 |
| 190 | 88 | 85 | 82 | 80 | 78 | 75 | 75 | 87 | 101 | 115 | 125 | 134 | 137 | 139 | 134 | 129 | 126 | 121 | 110 | 105 | 101 | 96 | 93 | 90 |
| 191 | | | | | | | | | | | | | | | | | | | | | | | | |
| 192 | 73 | 68 | 65 | 61 | 60 | 59 | 66 | 80 | 91 | 101 | 108 | 112 | 113 | 119 | 118 | 117 | 114 | 110 | 104 | 97 | 90 | 84 | 81 | 78 |
| 193 | 76 | 72 | 69 | 66 | 63 | 62 | 65 | 75 | 86 | 96 | 104 | 109 | 113 | 117 | 117 | 118 | 118 | 115 | 110 | 103 | 95 | 89 | 84 | 81 |
| 194 | 78 | 73 | 70 | 67 | 65 | 63 | 66 | 76 | 86 | 95 | 103 | 109 | 112 | 116 | 118 | 118 | 118 | 116 | 111 | 104 | 96 | 90 | 85 | 82 |
| 195 | 77 | 73 | 70 | 67 | 65 | 63 | 65 | 75 | 85 | 95 | 103 | 108 | 112 | 116 | 117 | 118 | 117 | 116 | 111 | 104 | 96 | 90 | 85 | 82 |
| 196 | 78 | 74 | 71 | 68 | 65 | 63 | 65 | 73 | 84 | 93 | 101 | 107 | 111 | 115 | 117 | 117 | 117 | 116 | 112 | 106 | 98 | 92 | 87 | 83 |
| 197 | 78 | 74 | 71 | 68 | 65 | 63 | 65 | 73 | 84 | 94 | 101 | 108 | 111 | 115 | 116 | 117 | 117 | 116 | 111 | 106 | 97 | 91 | 86 | 83 |
| 198 | 76 | 72 | 69 | 66 | 63 | 61 | 65 | 76 | 88 | 97 | 105 | 111 | 114 | 118 | 118 | 119 | 118 | 116 | 110 | 102 | 94 | 88 | 84 | 81 |
| 199 | 78 | 73 | 70 | 67 | 65 | 63 | 66 | 75 | 86 | 95 | 103 | 108 | 112 | 117 | 119 | 121 | 122 | 120 | 114 | 105 | 96 | 90 | 85 | 82 |

Note: Left column lists the data channel number. Remaining column headings list the time of day.

TABLE 4. Identification of Data Channels for Data Given in Table 3.

| THERMOCOUPLE CHANNEL LOCATIONS FOR JUNE 12, 1974 | | | |
|--------------------------------------------------|------------|------|-------------------------------|
| 1 | 2 | 3 | 4 |
| 1 2.75" ROCKET CONTAINER (LOADED) | DARK GRAY | 0.6 | TOP SKIN, BTM RD EAST |
| 2 | | | TOP SKIN, TOP RD WEST |
| 3 | | | CNTR GRAIN, TOP RD WEST |
| 4 | | | TOP OUTSIDE SKIN, CONT |
| 5 ZUNI POD (LOADED) | WHITE | 0.29 | ZUNI SKIN, TOP, EAST |
| 6 | | | ZUNI GRAIN, TOP, EAST |
| 7 | | | ZUNI SKIN, TOP, WEST |
| 8 | | | POD SURFACE TOP |
| 9 STEVENSEN SHELTER | | | AMBIENT AIR |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 14 20 MM AMMO IN CONTAINER | OLIVE DRAB | 0.7 | TOP ROW CENTER |
| 15 | | | MIDDLE ROW CENTER |
| 16 | | | |
| 17 30 CAL AMMO IN SMALL CONTAINER | OLIVE DRAB | 0.7 | TOP ROW CENTER |
| 18 30 CAL AMMO IN LARGE CONTAINER | BARE WOOD | 0.4 | MIDDLE ROW CENTER |
| 19 | | | TOP ROW CENTER |
| 20 50 CAL AMMO IN CONTAINER | OLIVE DRAB | 0.7 | TOP ROW CENTER |
| 21 | | | MIDDLE ROW CENTER |
| 22 | | | |
| 23 | | | |
| 24 | | | |
| 25 ASROC MOTOR IN CONTAINER | DARK GRAY | 0.8 | 1" INTO CRUCIFORM TOP |
| 26 | | | SHELL GRAIN TOP |
| 27 | | | TOP INSIDE SKIN OF MOTOR |
| 28 | | | AIR INSIDE CONTAINER |
| 29 | | | CONTAINER SKIN, TOP |
| 30 SPARROW MOTOR IN CONTAINER | DARK GRAY | 0.8 | CONTAINER SKIN, TOP |
| 31 | | | MOTOR GRAIN, CENTER |
| 32 | | | |
| 33 | | | |
| 34 | | | |
| 35 SPARROW MOTOR IN CONTAINER | DARK GRAY | 0.8 | MOTOR SKIN, TOP |
| 36 ALLUP SPARROW | WHITE | 0.29 | OUTBOARD, 34" FROM MOTOR HEAD |
| 37 | | | CNTR OF MOTOR STAR, 34" BACK |
| 38 | | | MOTOR SKIN, TOP, 34" BACK |
| 39 | | | INBOARD, 34" BACK |
| 40 36" THERMAL STANDARD | 310 SS | 0.6 | CENTER OF SPHERE |
| 41 | | | TOP |
| 42 | | | EAST 22 DEG UP |
| 43 | | | BOTTOM 20 DEG WEST |
| 44 | | | WEST 22 DEG UP |
| 45 | | | |
| 46 | | | |
| 47 | | | |
| 48 | | | |
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| 50 | | | |
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| 59 | | | |
| 60 | | | |
| 61 | | | |
| 62 | | | |
| 63 | | | |
| 64 | | | |
| 65 18" THERMAL STANDARD | 310 SS | 0.6 | TOP |
| 66 | | | EAST |
| 67 | | | BOTTOM |
| 68 | | | WEST |
| 69 | | | CENTER |
| 70 SAND SURFACE | | 0.6 | |
| 71 | | | |

Note: Data channel is listed in first column; Column 2 is surface paint color or material; Column 3 is a best estimate of surface absorptivity

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TABLE 4. (Contd.)

| THERMOCOUPLE CHANNEL LOCATIONS FOR JUNE 12, 1974 | | | |
|--------------------------------------------------|------------------------------|------------|--------------------------------------|
| | 1 | 2 | 3 |
| 72 | | | |
| 73 | | | |
| 74 | 60" THERMAL STANDARD | 310 SS | 0.6 TOP |
| 75 | | | EAST |
| 76 | | | BOTTOM |
| 77 | | | WEST |
| 78 | | | CENTER |
| 79 | | | |
| 80 | | | |
| 81 | SHRIKE COMPUTER SECTION | WHITE | 0.29 BOTTOM OUTSIDE SKIN |
| 82 | | WHITE | 0.29 EAST OUTSIDE SKIN |
| 83 | | WHITE | 0.29 TOP SKIN, CNTR MODULE |
| 84 | | WHITE | 0.29 WEST, CENTER MODULE |
| 85 | | WHITE | 0.29 BOTTOM, CNTR MODULE |
| 86 | | WHITE | 0.29 EAST, CNTR MODULE |
| 87 | | WHITE | 0.29 BTM EAST MOD BOLT |
| 88 | | WHITE | 0.29 CN TR AIR 4TH MODULE |
| 89 | | WHITE | 0.29 AFT CNTR ALUM SURF |
| 90 | | WHITE | 0.29 FWD CNTR ALUM SURF |
| 91 | | WHITE | 0.29 EAST ANT FUSE SURF |
| 92 | | WHITE | 0.29 " " " CENTER |
| 93 | | OLIVE DRAB | 0.7 WEST ANT FUSE SURF |
| 94 | | OLIVE DRAB | 0.7 " " " CENTER |
| 95 | SHRIKE WARHEAD SECTION | WHITE | 0.29 OUTSIDE SKIN EAST UP 45 DEG |
| 96 | | WHITE | 0.29 " " " WEST UP 45 DEG |
| 97 | | WHITE | 0.29 " " " DOWN 45 DEG |
| 98 | | WHITE | 0.29 " " " EAST DOWN 45 DEG |
| 99 | | WHITE | 0.29 1-7/8" FROM CNTR EAST UP 45 DEG |
| 100 | | WHITE | 0.29 " " " " WEST UP 45 DEG |
| 101 | | WHITE | 0.29 " " " " WEST DWN 45 DEG |
| 102 | | WHITE | 0.29 " " " " EAST DWN 45 DEG |
| 103 | | WHITE | 0.29 INSIDE CENTER |
| 104 | | WHITE | 0.29 INSIDE CENTER |
| 105 | SHRIKE CONTROL SECTION | WHITE | 0.29 TOP SKIN, OUTSIDE |
| 106 | | WHITE | 0.29 CENTER PLASTIC SURFACE |
| 107 | | WHITE | 0.29 CNTR STEEL BULKHEAD |
| 108 | | WHITE | 0.29 TOP SURF GAS GEN STEEL |
| 109 | SHRIKE MOTOR SECTION | WHITE | 0.29 TOP SKIN, SLIGHT WEST |
| 110 | | WHITE | 0.29 TOP SKIN, SLIGHT EAST |
| 111 | | WHITE | 0.29 OUTSIDE SKIN, EAST |
| 112 | | WHITE | 0.29 OUTSIDE SKIN, BOTTOM |
| 113 | | WHITE | 0.29 OUTSIDE SKIN, WEST |
| 114 | | WHITE | 0.29 1-7/8" FROM CNTR, WEST |
| 115 | | WHITE | 0.29 " " " " " TOP |
| 116 | | WHITE | 0.29 " " " " " EAST |
| 117 | | WHITE | 0.29 " " " " " BOTTOM |
| 118 | | WHITE | 0.29 INSIDE CENTER |
| 119 | | | |
| 120 | | | |
| 121 | | | |
| 122 | | | |
| 123 | | | |
| 124 | | | |
| 125 | ZUNION A-4 AIRCRAFT | | SKIN UNDER CENTER |
| 126 | | | SKIN FORWARD |
| 127 | | | SKIN CENTER |
| 128 | SHRIKE ON A-4 AIRCRAFT | | TOP CENTER |
| 129 | | | INSIDE |
| 130 | 2.75" CLUSTER ON AD AIRCRAFT | | INSIDE |
| 131 | | | INSIDE |
| 132 | | | CENTER SURFACE |
| 133 | | | CENTER UNDER SURFACE |
| 134 | | | MISSILE HEAD SURFACE |
| 135 | BOMBS ON AD AIRCRAFT | | MK 81 BOMB INSIDE |
| 136 | | | MK 81 CENTER SURFACE |
| 137 | SIDEWINDER ON AD AIRCRAFT | WHITE | 0.29 SIDEWINDER |
| 138 | | | SIDEWINDER |
| 139 | | | SIDEWINDER |
| 140 | 500 LB BOMB ON AD AIRCRAFT | | SKIN |
| 141 | | | INSIDE |
| 142 | 100 LB BOMB ON AD AIRCRAFT | | SKIN |

Note: Data channel is listed in first column; Column 2 is surface paint color or material; Column 3 is a best estimate of surface absorptivity

TABLE 4. (Contd.)

| | 1 | 2 | 3 | 4 |
|-----|---------------------------|------------|------|--------------------------|
| 143 | | | | INSIDE |
| 144 | | | | |
| 145 | A4 AIRCRAFT CLOSED CANOPY | | | RAEPEC GRAIN BOTTOM CNTR |
| 146 | | | | " GRAIN NEAR CENTER |
| 147 | | | | " GRAIN NEAR TOP |
| 148 | | | | " SKIN NEAR BOTTOM |
| 149 | | | | " SKIN CENTER |
| 150 | | | | " SKIN TOP |
| 151 | | | | INST CONSOLE WEST SIDE |
| 152 | | | | INST CONSOLE EAST SIDE |
| 153 | | | | GAGES EAST SIDE |
| 154 | | | | GAGES WEST SIDE |
| 155 | | | | INST TOP WEST SIDE |
| 156 | | | | INST BOTTOM |
| 157 | A4 AIRCRAFT OPEN CANOPY | | | SAME AS 145 |
| 158 | | | | SAME AS 146 |
| 159 | | | | SAME AS 147 |
| 160 | | | | SAME AS 148 |
| 161 | | | | SAME AS 149 |
| 162 | | | | SAME AS 150 |
| 163 | | | | SAME AS 151 |
| 164 | | | | SAME AS 152 |
| 165 | | | | SAME AS 153 |
| 166 | | | | SAME AS 154 |
| 167 | | | | SAME AS 155 |
| 168 | | | | SAME AS 156 |
| 169 | | | | |
| 170 | | | | |
| 171 | | | | |
| 172 | | | | |
| 173 | | | | |
| 174 | | | | |
| 175 | | | | |
| 176 | | | | |
| 177 | | | | |
| 178 | | | | |
| 179 | | | | |
| 180 | | | | |
| 181 | | | | |
| 182 | | | | |
| 183 | BOMB-250 POUND | OLIVE DRAB | 0.7 | TOP SKIN WEST ROUND |
| 184 | | OLIVE DRAB | 0.7 | CENTER, WEST ROUND |
| 185 | | | | |
| 186 | | | | |
| 187 | | | | |
| 188 | | | | |
| 189 | | | | |
| 190 | | | | |
| 191 | | | | |
| 192 | SHRIKE GUIDANCE SECTION | WHITE | 0.29 | RADOME TOP SKIN |
| 193 | | WHITE | 0.29 | RF TOP SKIN |
| 194 | | WHITE | 0.29 | RF CENTER OF ANTEN |
| 195 | | WHITE | 0.29 | " " ON ALUM. ROD |
| 196 | | WHITE | 0.29 | " " IN AIR |
| 197 | | WHITE | 0.29 | AFT CNTR ANTEN SECT |
| 198 | SHRIKE COMPUTER SECTION | WHITE | 0.29 | TOP OUTSIDE SKIN |
| 199 | | WHITE | 0.29 | WEST OUTSIDE SKIN |
| 200 | | | | |

Note: Data channel is listed in first column; Column 2 is surface paint color or material;
Column 3 is a best estimate of surface absorptivity

Appendix A

THERMAL DATA, 12 JUNE 1974 TESTS

This appendix contains graphs showing temperature versus time of day for the Shrike missile, as measured during the 12 June 1974 tests (Figures A-1 through A-7). For purposes of comparison with measurements taken with the thermal standard device, a graph of thermal standard data taken on the same date (Figure A-8) is included. The data channels depicted in the graphs are identified in Table A-1. (The locations of all of the data channels and copper-constantan thermocouples (TCs) used in these tests were illustrated in Appendix A, Part 1, NWC TP 5923.) The missile was an all-up Shrike, model AGM-45A-3. Its nose was pointed north. It had an inert plastic, cast warhead. The motor was filled with dry desert sand. It had no fins.

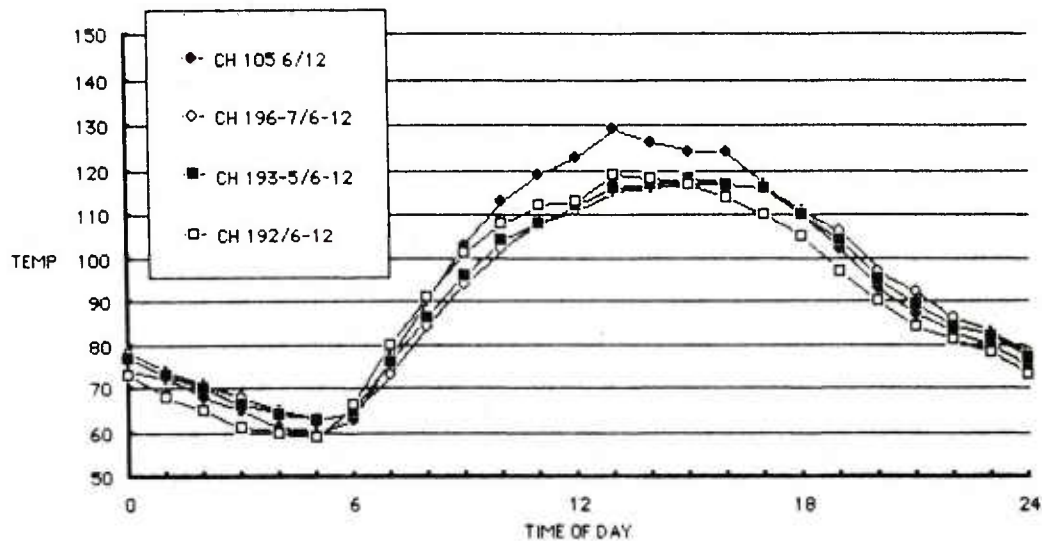


FIGURE A-1. All-Up Shrike, Channels 105, 196-197, 193-195, and 192.

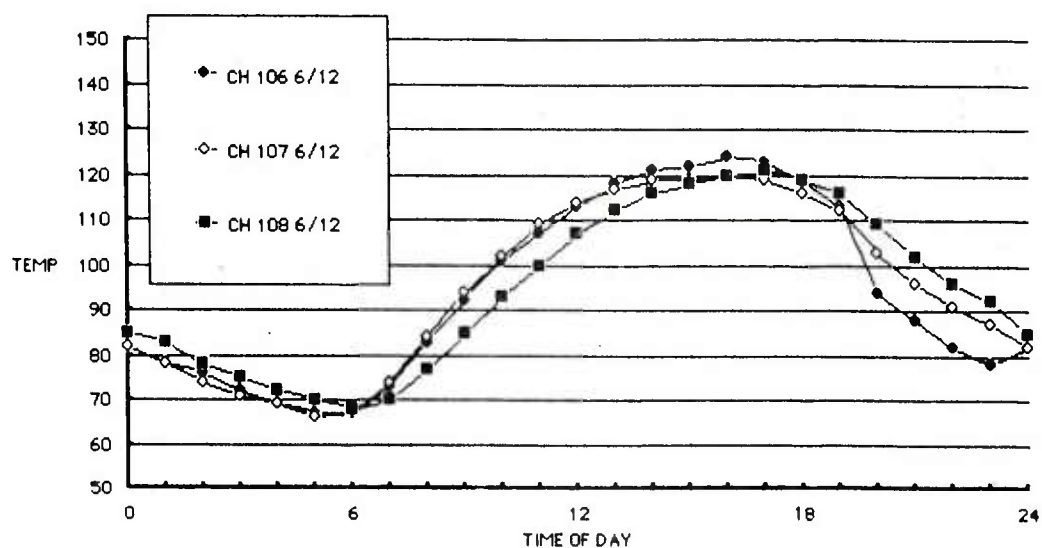


FIGURE A-2. All-Up Shrike, Channels 106, 107, and 108.

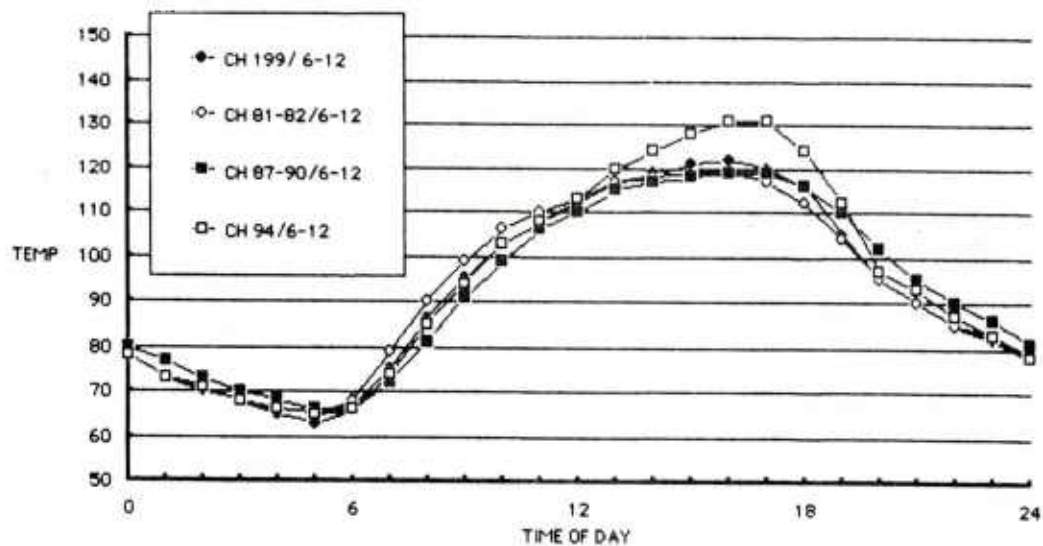


FIGURE A-3. All-Up Shrike, Channels 199, 81-82, 87-90, and 94.

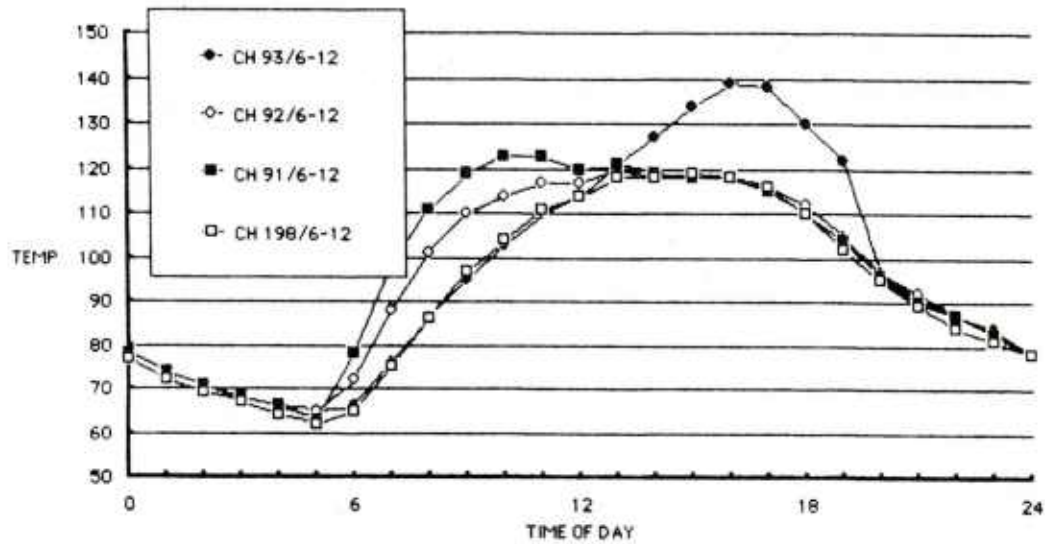


FIGURE A-4. All-Up Shrike, Channels 93, 92, 91, and 198.

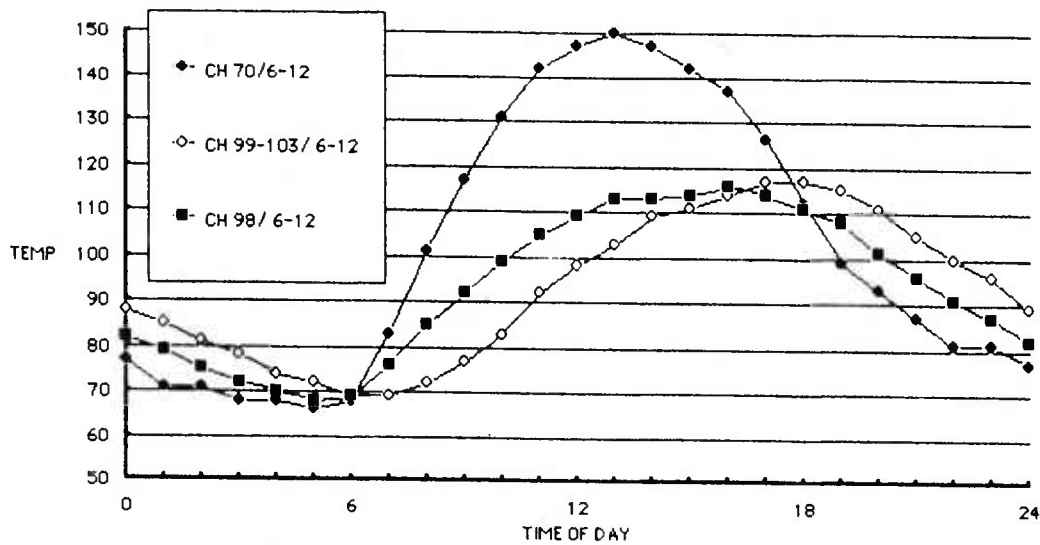


FIGURE A-5. All-Up Shrike, Channels 70, 99-103, and 98.

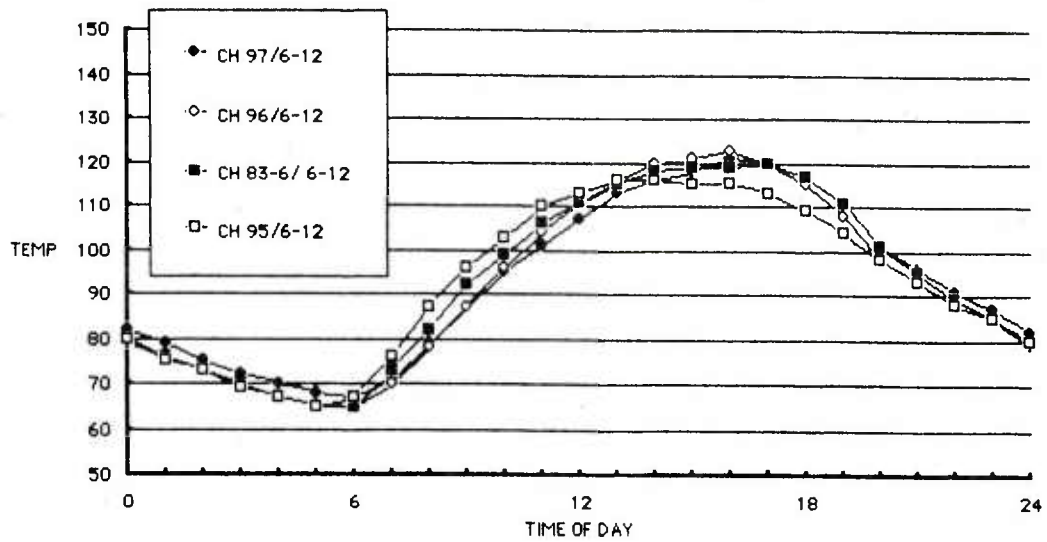


FIGURE A-6. All-Up Shrike, Channels 97, 96, 83-86, and 95.

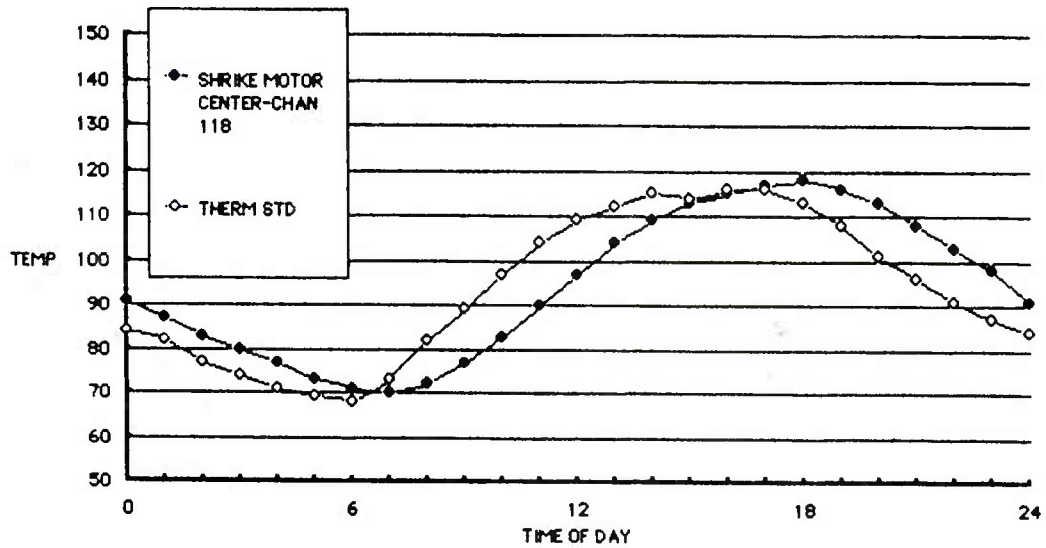


FIGURE A-7. Shrike Computer/Control Section, Channel 118.

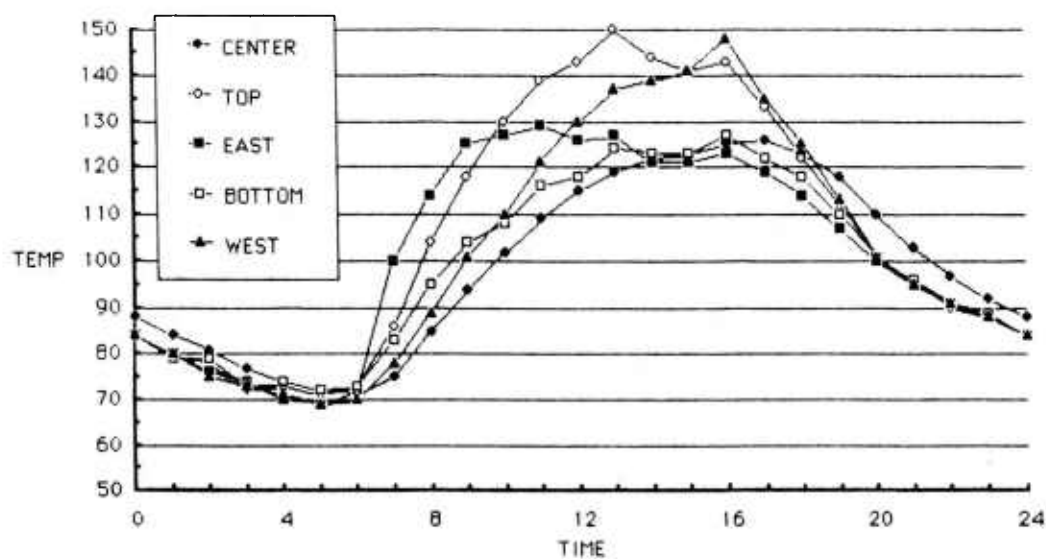


FIGURE A-8. Thermal Standard, 12 June 1974.

TABLE A-1. Data Channels, 12 June 1974 Tests.

| Data channel | TC | Missile section | Location |
|--------------|----|-------------------|----------------------------|
| 65 | | Thermal standard | |
| 66 | | Thermal standard | |
| 67 | | Thermal standard | |
| 68 | | Thermal standard | |
| 69 | | Thermal standard | |
| 70 | | Sand surface | |
| 81 | 9 | Guidance computer | Bottom, outside skin |
| 82 | 10 | Guidance computer | East side, outside skin |
| 83 | 11 | Guidance computer | Top skin, center module |
| 84 | 12 | Guidance computer | West skin, center module |
| 85 | 13 | Guidance computer | Bottom skin, center module |

TABLE A-1. (Contd.)

| Data channel | TC | Missile section | Location |
|--------------|----|-------------------|---------------------------------------------|
| 86 | 14 | Guidance computer | East skin, center module |
| 87 | 15 | Guidance computer | Bottom east, module bolt |
| 88 | 16 | Guidance computer | Center air, fourth module from aft |
| 89 | 17 | Guidance computer | Aft center on thin aluminum surface |
| 90 | 18 | Guidance computer | Forward surface, aluminum surface |
| 91 | 19 | Guidance computer | East antenna fuze, outside surface |
| 92 | 20 | Guidance computer | East antenna fuze, center |
| 93 | 21 | Guidance computer | West antenna fuze, outside surface |
| 94 | 22 | Guidance computer | West antenna fuze, center |
| 95 | 23 | Warhead | Outside skin, 10:30 o'clock east |
| 96 | 24 | Warhead | Outside skin, 1:30 o'clock west |
| 97 | 25 | Warhead | Outside skin, 4:30 o'clock west |
| 98 | 26 | Warhead | Outside skin, 7:30 o'clock east |
| 99 | 27 | Warhead | Inside, 1 7/8 inch from center, 10:30 east |
| 100 | 28 | Warhead | Inside, 1 7/8 inch from center, 1:30 west |
| 101 | 29 | Warhead | Inside, 1 7/8 inch from center, 4:30 west |
| 102 | 30 | Warhead | Inside, 1 7/8 inch from center, 7:30 east |
| 103 | 31 | Warhead | Inside, center |
| 105 | 33 | Control | Top outside skin, aluminum |
| 106 | 34 | Control | Center of section, nonmetal |
| 107 | 35 | Control | Bulkhead, steel |
| 108 | 36 | Control | Top outside surface of gas generator, steel |
| 110 | 38 | Motor | Top outside skin, slightly east |
| 111 | 39 | Motor | Outside skin, east side |
| 112 | 30 | Motor | Outside skin, bottom |
| 113 | 41 | Motor | Outside skin, west side |
| 118 | 46 | Motor | Inside center |
| 192 | 1 | Guidance | Top outside skin (nonmetal) |
| 193 | 2 | Guidance | Top outside skin, aluminum |
| 194 | 3 | Guidance | Center surface antenna, nonmetal |
| 195 | | Guidance | Inside center antenna RF on aluminum rod |
| 196 | 5 | Guidance | Inside center antenna RF (air) |
| 197 | 6 | Guidance | Aft center RF antenna on aluminum surface |
| 198 | 7 | Guidance computer | Top outside skin |
| 199 | 8 | Guidance computer | West side, outside skin |

Appendix B

THERMAL DATA, 28 JUNE 1974 TESTS

This appendix contains graphs showing temperature versus time of day for the Shrike missile in a container, as measured during the 28 June 1974 tests (Figures B-1 through B-9). The locations of the data channels depicted in the graphs have already been identified. (The locations of all of the data channels and copper-constantan thermocouples (TCs) used in these tests were illustrated in Appendix B, Part 1, NWC TP 5923.) The missile was an all-up Shrike, model AGM-45A-3, in a single-store container, Mk 399. The nose was pointed north in the container. The container was freshly painted a light navy gray, and it was made of 16-gage steel.

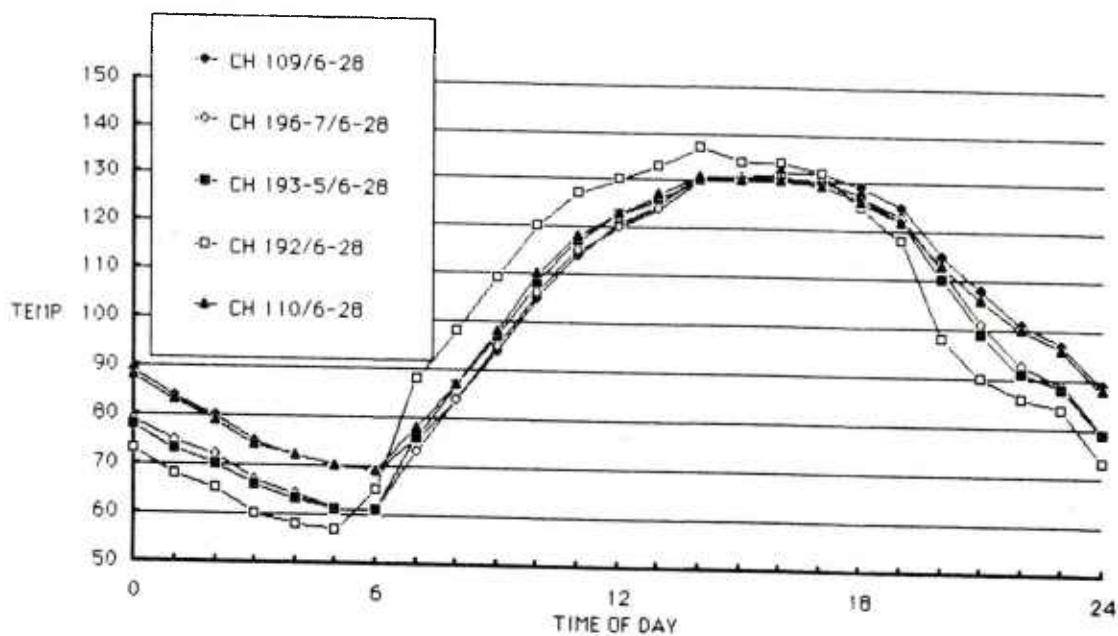


FIGURE B-1. Shrike in Single-Store Container, Channels 109, 196-197, 193-195, 192, and 110.

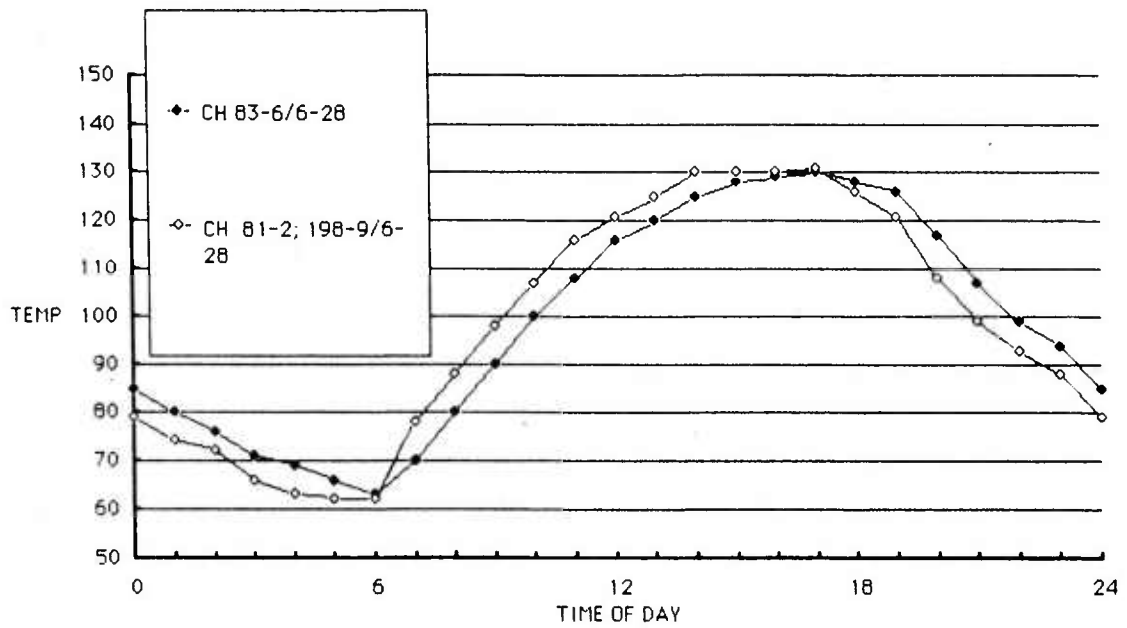


FIGURE B-2. Shrike in Single-Store Container, Channels 83-86 and 81-82.

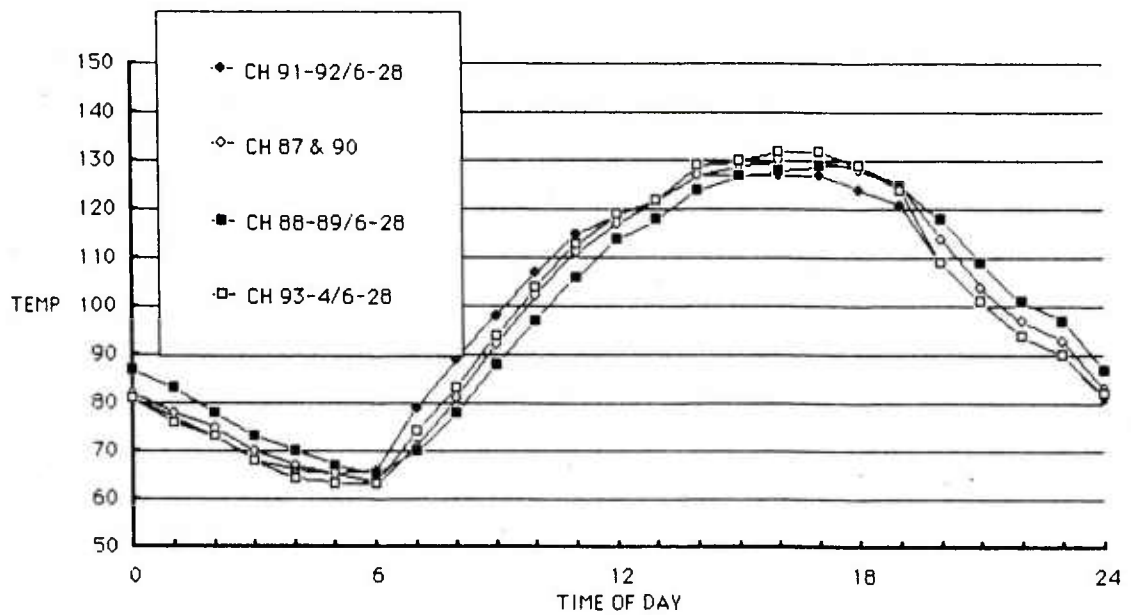


FIGURE B-3. Shrike in Single-Store Container, Channels 91-92, 87 and 90, 88-89, and 93-94.

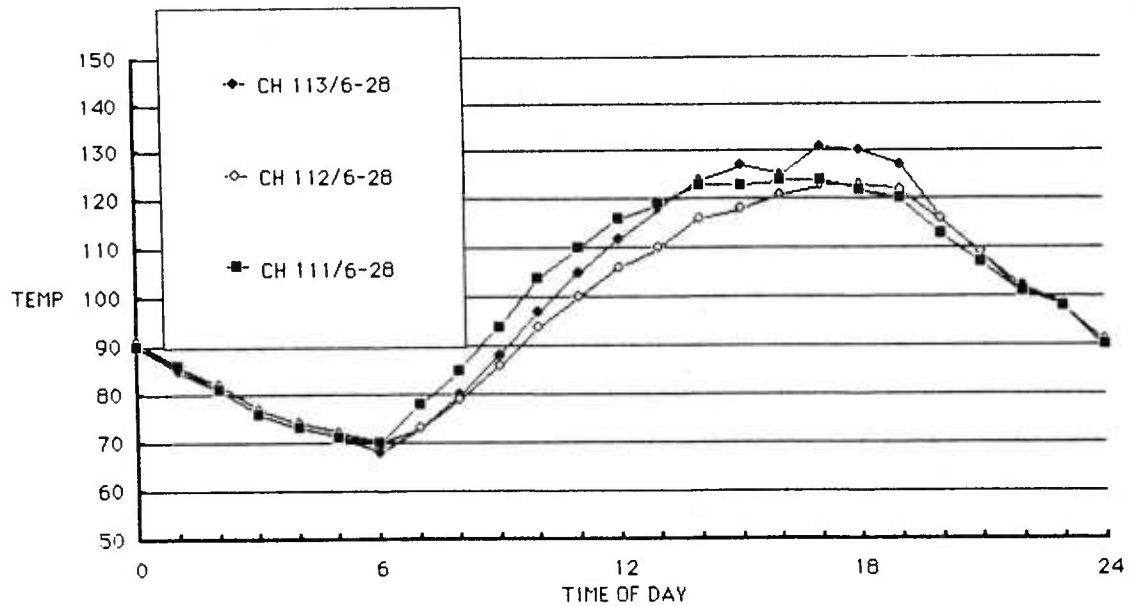


FIGURE B-4. Shrike in Single-Store Container, Channels 113, 112, and 111.

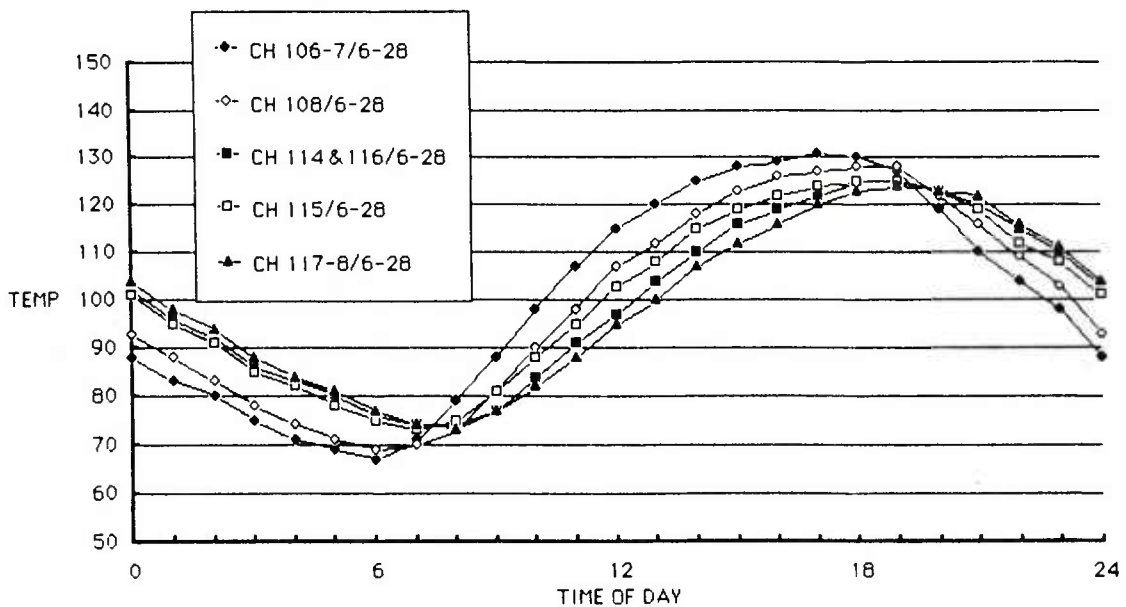


FIGURE B-5. Shrike in Single-Store Container, Channels 106 and 107, 108, 114 and 116, 115, and 117-118.

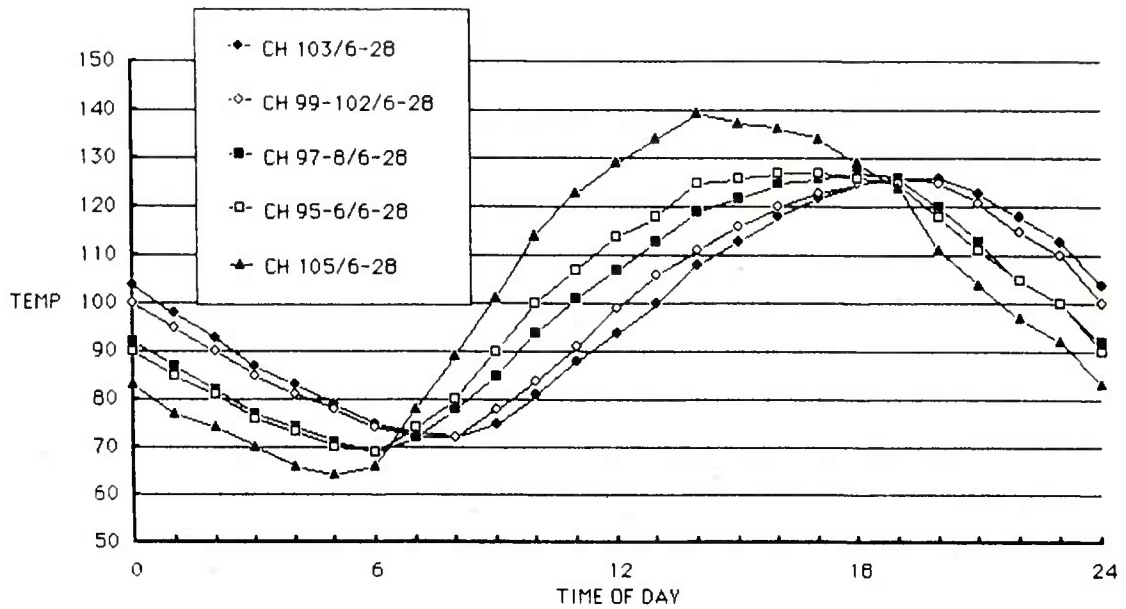


FIGURE B-6. Shrike in Single-Store Container, Channels 103, 99-102, 97-98, 95-96, and 105.

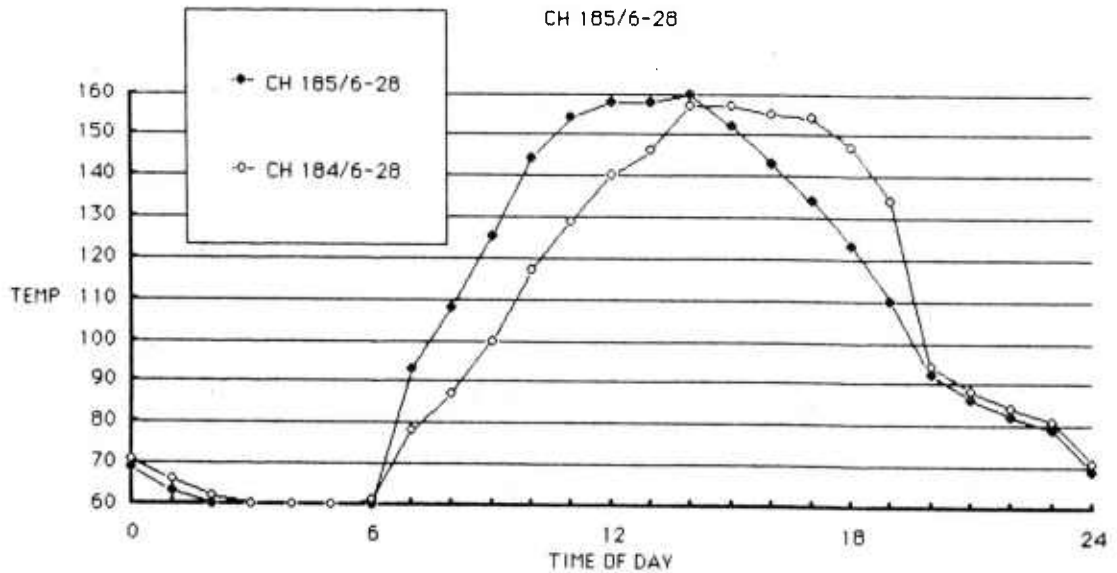


FIGURE B-7. Shrike in Single-Store Container, Channels 185 and 184.

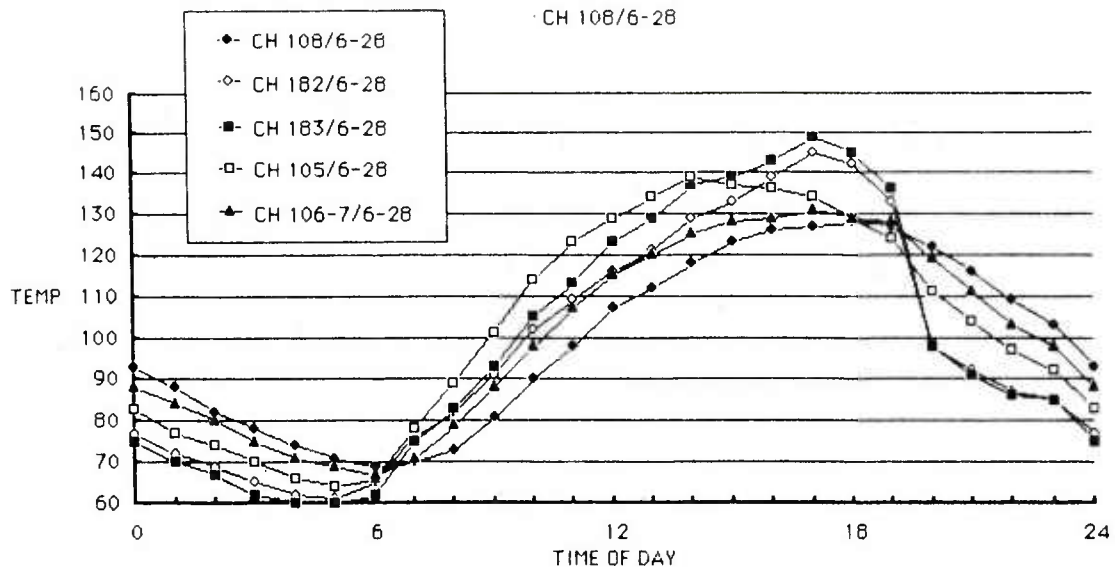


FIGURE B-8. Shrike in Single-Store Container; Channels 108, 182, 183, 105, and 106 and 107.

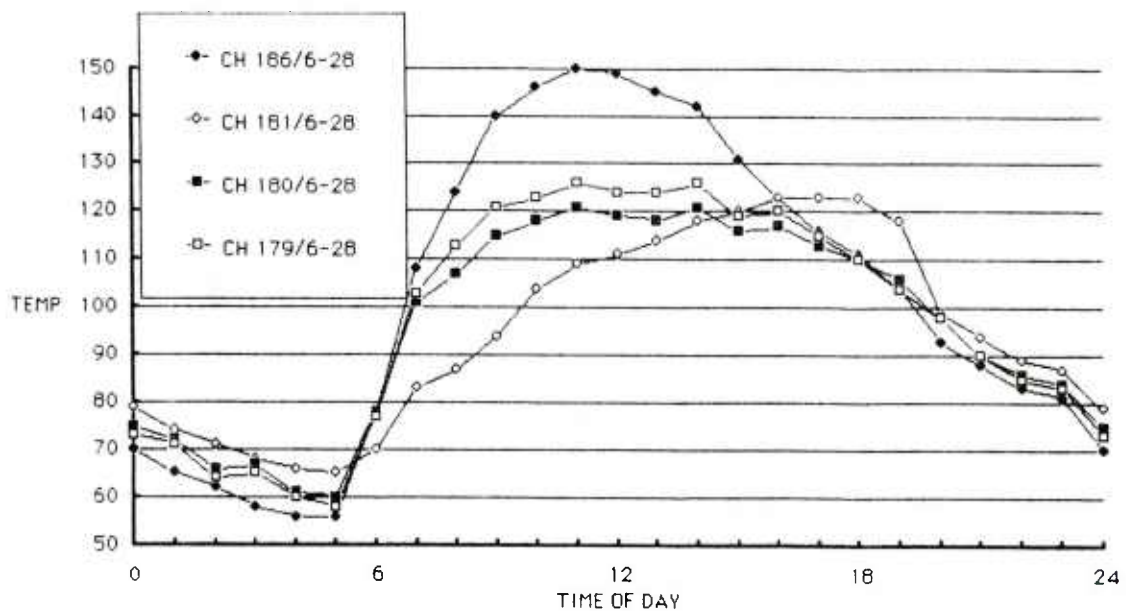


FIGURE B-9. Shrike in Single-Store Container, Channels 186, 181, 180, and 179.

Appendix C

THERMAL DATA, 29 AUGUST 1974 TESTS

This appendix contains graphs showing temperature versus time of day for the Sidewinder missile, as measured during the 29 August 1974 tests (Figures C-1 through C-7). Figures C-8 and C-9 show data taken with the thermal standard device on the same day for purposes of comparison. The data channels depicted in the graphs are identified in Table C-1. (The locations of all of the data channels and copper-constantan thermocouples (TCs) used in these tests were illustrated in Appendix C, Part 1, NWC TP 5923.) The missile was an all-up Sidewinder AIM-9H-2, complete with fins. The nose was pointed north. It was freshly painted epoxy white or, in some cases, olive (identified in the figure captions.)

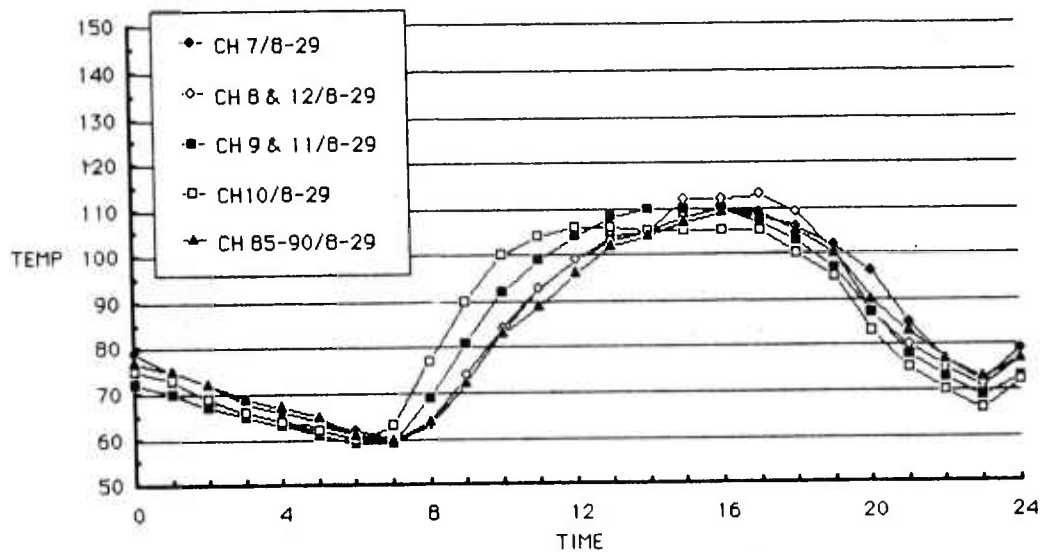


FIGURE C-1. All-up Sidewinder, Channels 7, 8, and 12; 9 and 11; 10, and 85-90.

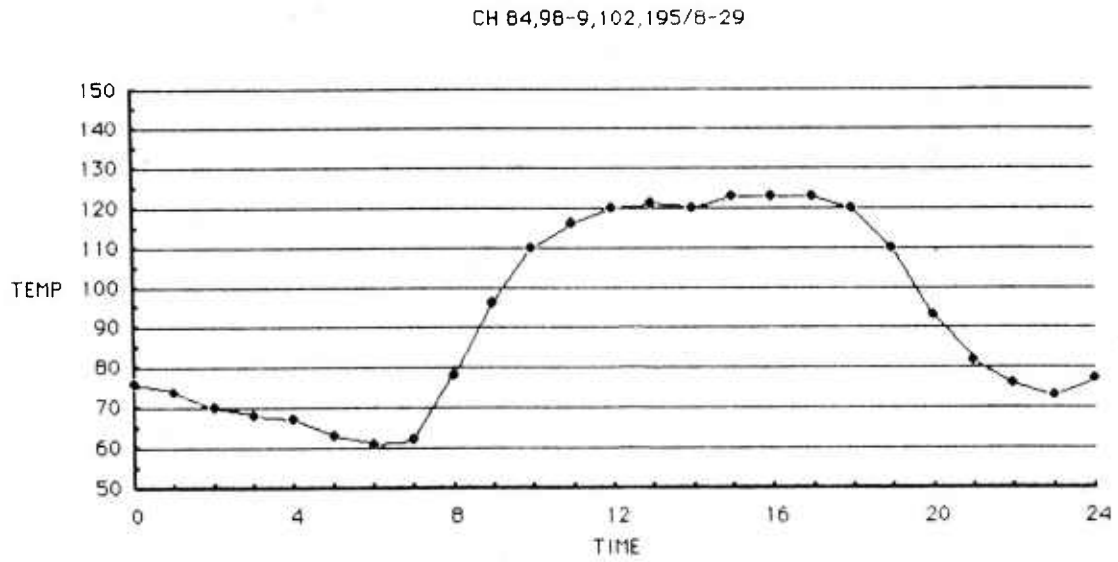


FIGURE C-2. Sidewinder Control Section, Channels 84, 98-99, 102, and 195.

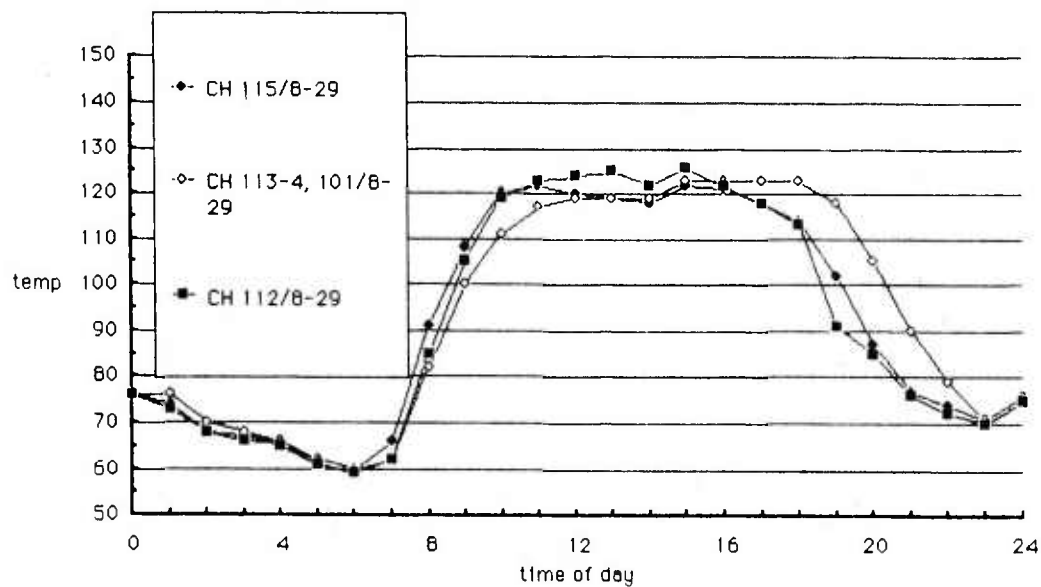


FIGURE C-3. Sidewinder Control Section (Olive), Channels 115, 113-114, and 112.

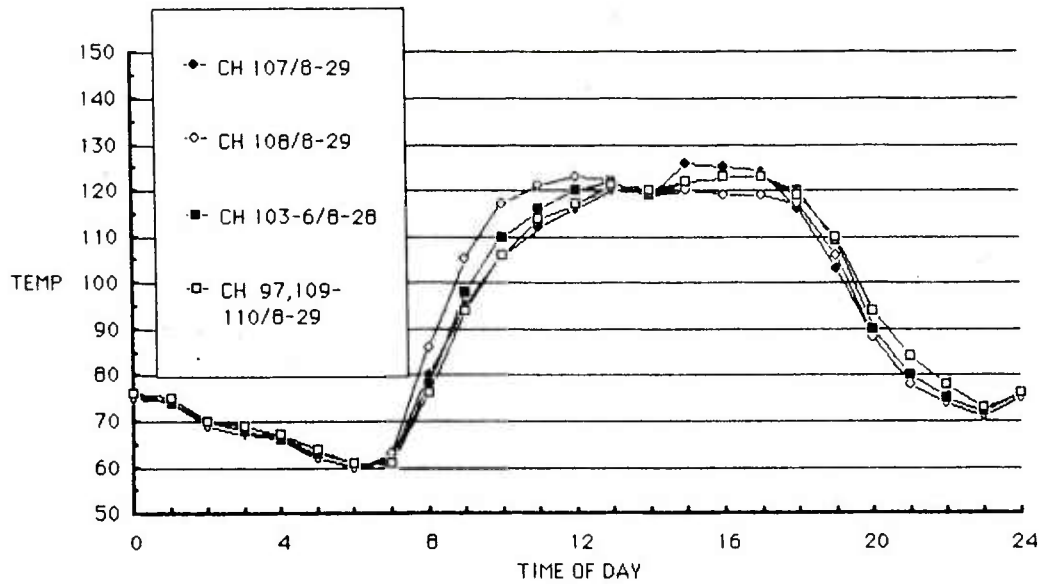


FIGURE C-4. Sidewinder Control Section (Olive), Channels 107, 108, 103-106, and 97 plus 109-110.

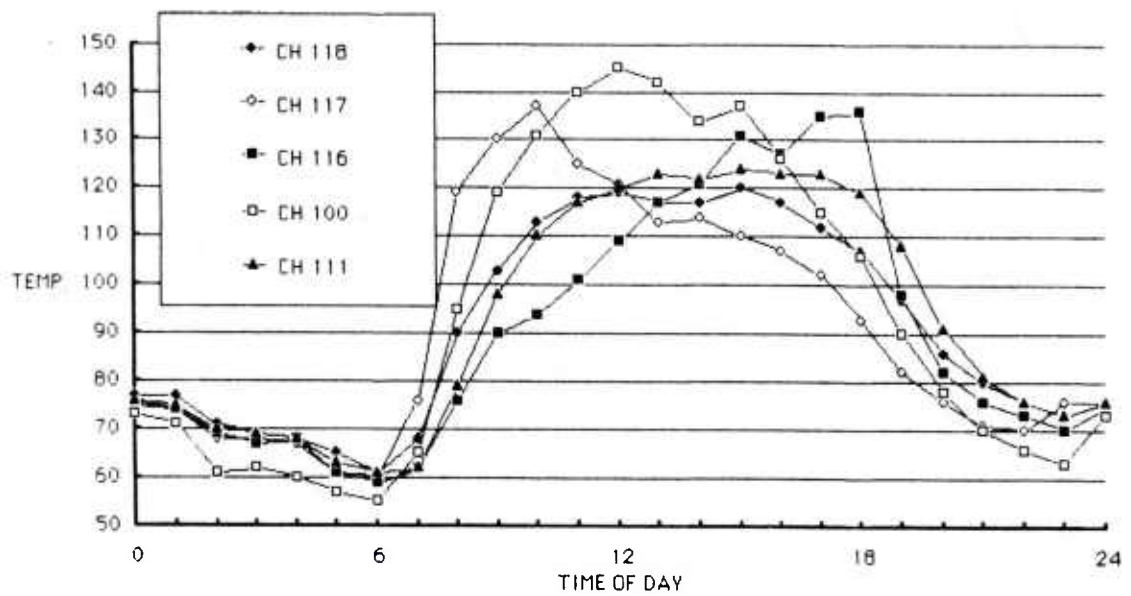


FIGURE C-5. All-Up Sidewinder, Channels 118, 117, 116, 100, and 111.

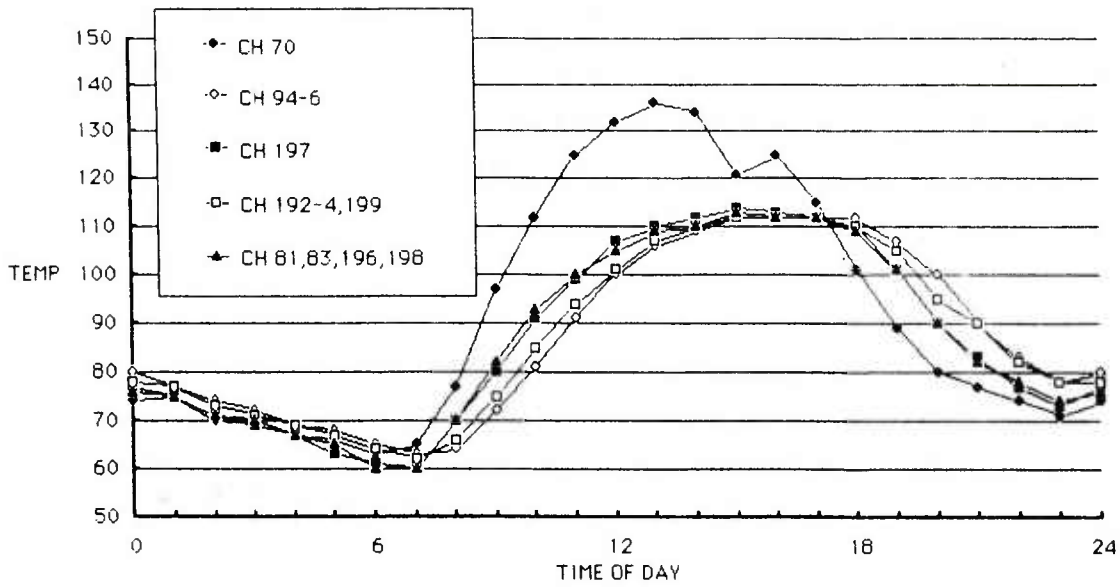


FIGURE C-6. All-Up Sidewinder, Channels 70, 94-96, 197, 192-194, and 81, 83, and 86.

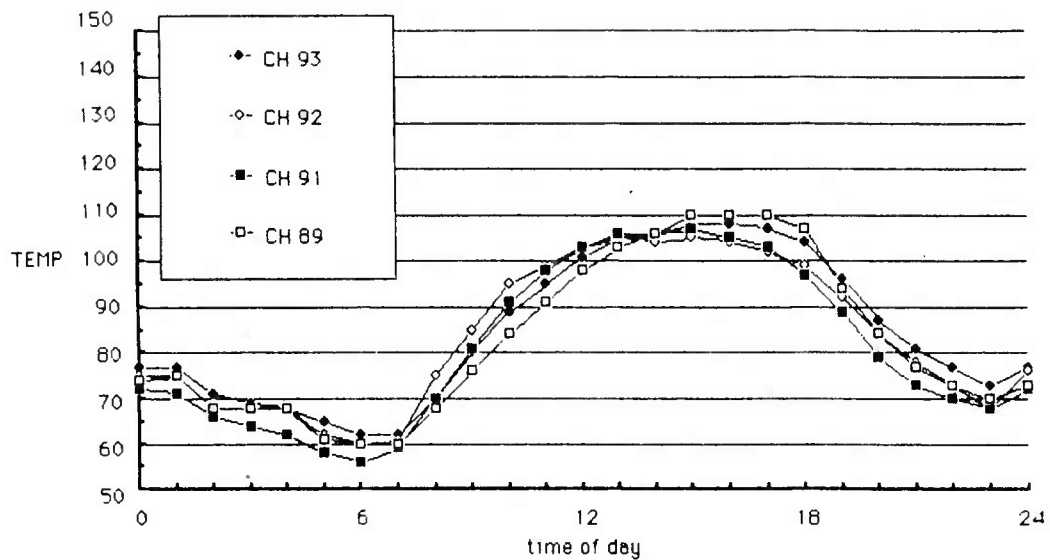


FIGURE C-7. Sidewinder Motor, Channels 93, 92, 91, and 89.

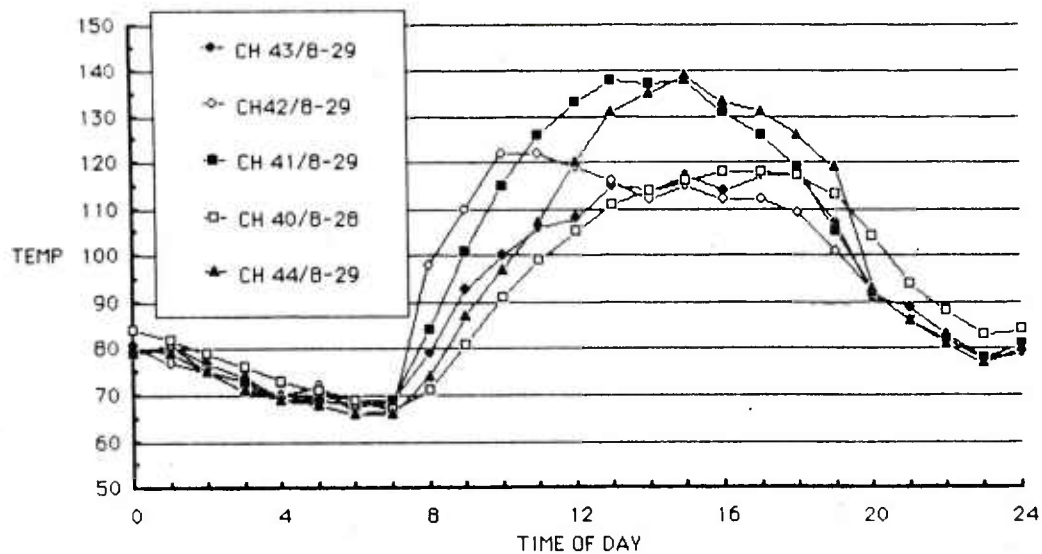


FIGURE C-8. Thermal Standard (36 inch) Data for 29 August 1974; Channels 43, 42, 41, 40, and 44.

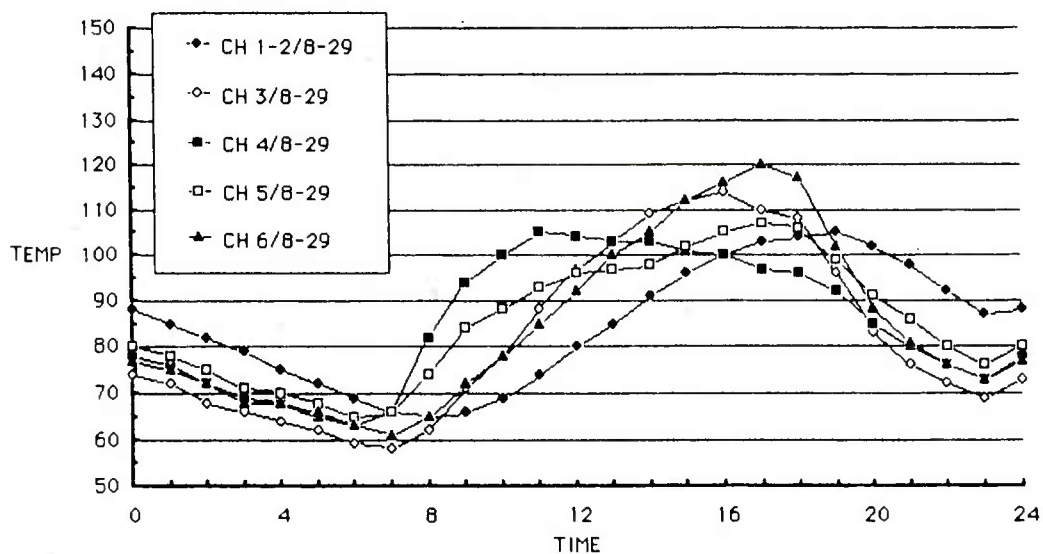


FIGURE C-9. Thermal Standard for 29 August 1974; Channels 1, 3, 4, 6, and 6.

TABLE C-1. Data Channels, 29 August 1974 Tests.

| Data channel | TC | Missile section | Location |
|--------------|----|-------------------|-----------------------------------------------|
| 1 | | Thermal standard | |
| 2 | | Thermal standard | |
| 3 | | Thermal standard | |
| 4 | | Thermal standard | |
| 5 | | Thermal standard | |
| 6 | | Thermal standard | |
| 7 | | All-up Sidewinder | |
| 8 | | All-up Sidewinder | |
| 9 | | All-up Sidewinder | |
| 10 | | All-up Sidewinder | |
| 11 | | All-up Sidewinder | |
| 12 | | All-up Sidewinder | |
| 40 | | Thermal standard | |
| 41 | | Thermal standard | |
| 42 | | Thermal standard | |
| 43 | | Thermal standard | |
| 44 | | Thermal standard | |
| 70 | | Sand | |
| 81 | 33 | Warhead | Top outside surface, case |
| 83 | 35 | Warhead | East outside surface, case |
| 84 | 5 | Control | West side control module |
| 85 | 40 | Motor | Inside motor, 1 1/4 inches from bottom |
| 86 | 41 | Motor | Center |
| 87 | 42 | Motor | Inside motor, 1 1/4 inches from top |
| 88 | 43 | Motor | Inside motor, 1 1/4 inches from east side |
| 89 | 48 | Motor | West outside surface |
| 90 | 44 | Motor | Inside motor, 1 1/4 inches from west side |
| 91 | 45 | Motor | Top surface |
| 92 | 46 | Motor | East outside surface |
| 93 | 47 | Motor | Bottom outside surface |
| 94 | 37 | Warhead | Center of tube in air |
| 95 | 38 | Warhead | East inside surface of grain |
| 96 | 39 | Warhead | West inside surface of grain |
| 97 | 1 | Control | Aluminum surface center aft of seeker section |
| 98 | 2 | Control | Center of control modules |
| 99 | 3 | Control | East side control modules |

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TABLE C-1. (Contd.)

| Data channel | TC | Missile section | Location |
|--------------|----|-------------------------|-----------------------------------|
| 100 | 23 | Target detecting device | Top outside surface, nonmetal |
| 102 | 6 | Control | Bottom control modules |
| 103 | 10 | Control | Bottom actuator |
| 104 | 8 | Control | Top actuator |
| 105 | 9 | Control | West actuator |
| 106 | 7 | Control | Side of east actuator |
| 107 | 12 | Control | West side actuator arm at 1:00 |
| 108 | 11 | Control | East side actuator arm at 10:00 |
| 109 | 13 | Control | Center |
| 110 | 14 | Control | Center surface gas generator |
| 111 | 15 | Control | Under nut |
| 112 | 16 | Control | Top outside surface |
| 113 | 17 | Control | West outside surface |
| 114 | 18 | Control | Bottom outside surface |
| 115 | 19 | Control | East outside surface |
| 116 | 20 | Target detecting device | West outside surface (nonmetal) |
| 117 | 21 | Target detecting device | East Outside surface (nonmetal) |
| 118 | 22 | Target detecting device | Bottom outside surface (nonmetal) |
| 192 | 25 | Warhead | Top surface of grain |
| 193 | 26 | Warhead | West surface of grain |
| 194 | 27 | Warhead | East surface of grain |
| 195 | 4 | Control | Top control colule |
| 196 | 30 | Warhead | Top inside surface of case |

Appendix D

THERMAL DATA, 11 SEPTEMBER 1974 TESTS

This appendix contains graphs showing temperature versus time of day for the Sidewinder and Shrike missiles in multistore containers, as measured during the 11 September 1974 tests (Figures D-1 through D-6). Thermal standard data for the same date are given in Figures D-7 and D-8. The data channels depicted in the graphs are identified in Table D-1.

The Sidewinder AIM-9II-2 missile was located in the west side storage location of a multistore container, and three other missiles filled the other storage locations in the container to simulate a full container. The missile was pointed north. The multistore container is all-white acrylic material. Data of Figures D-1 through D-3 are of this missile.

The Shrike AGM-45A-3, nose pointed north, was located on the west side of the multistore container. Two other Shrike missiles were placed east of the measured missile in order to simulate a true multistore condition. The multistore container was made of white acrylic on top and of gray aluminum on the bottom. Data of Figures D-4 through D-6 are of this missile.

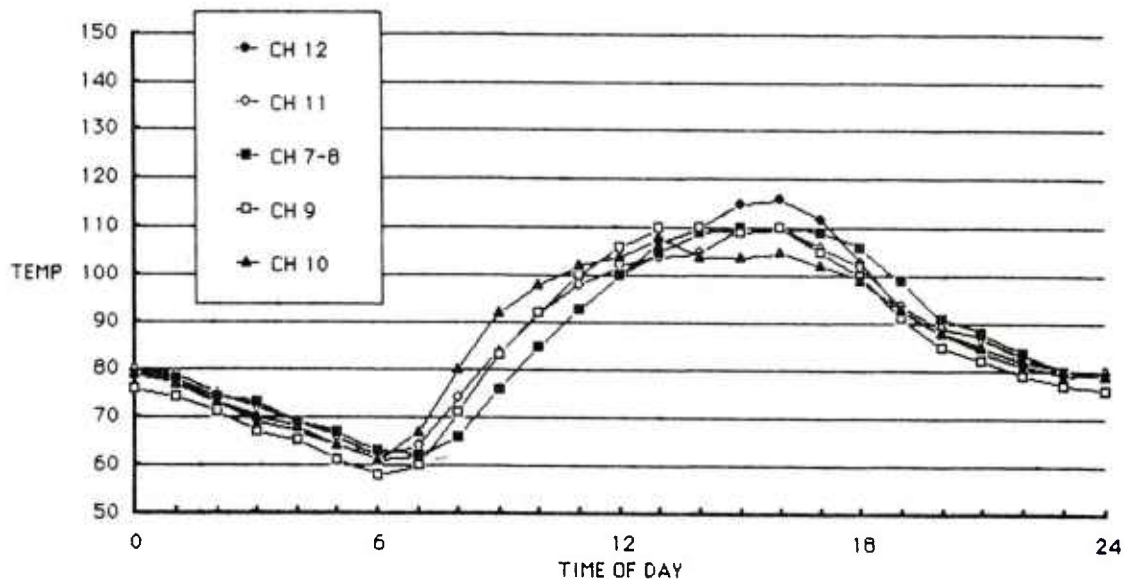


FIGURE D-1. Sidewinder in Container; Channels 12, 11, 7-8, 9, and 10.

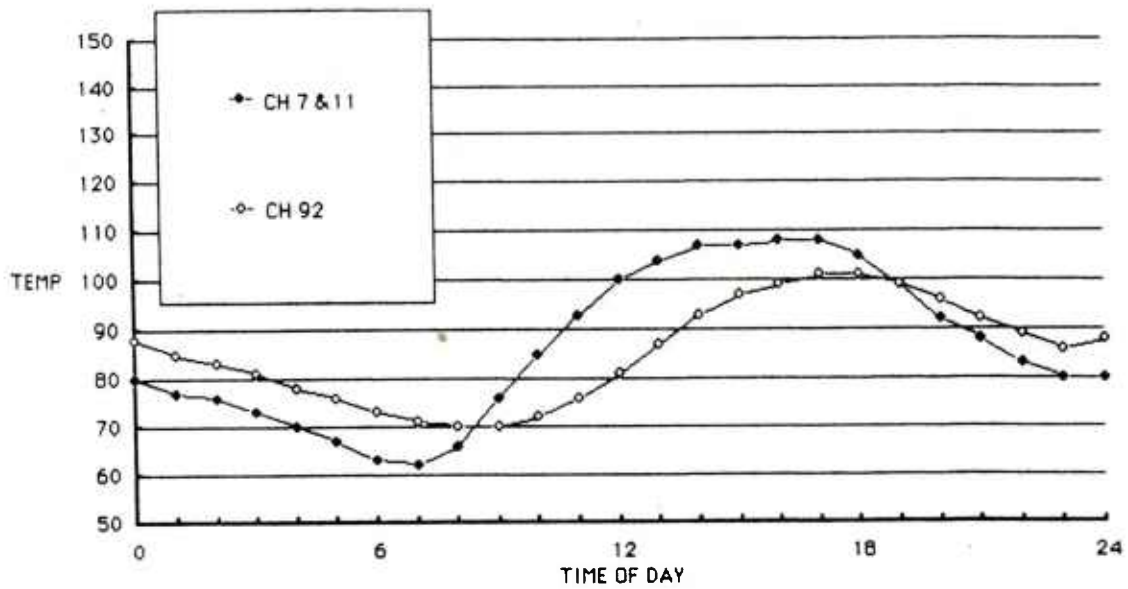


FIGURE D-2. Sidewinder in Containers; Channels 7 and 11 and 92.

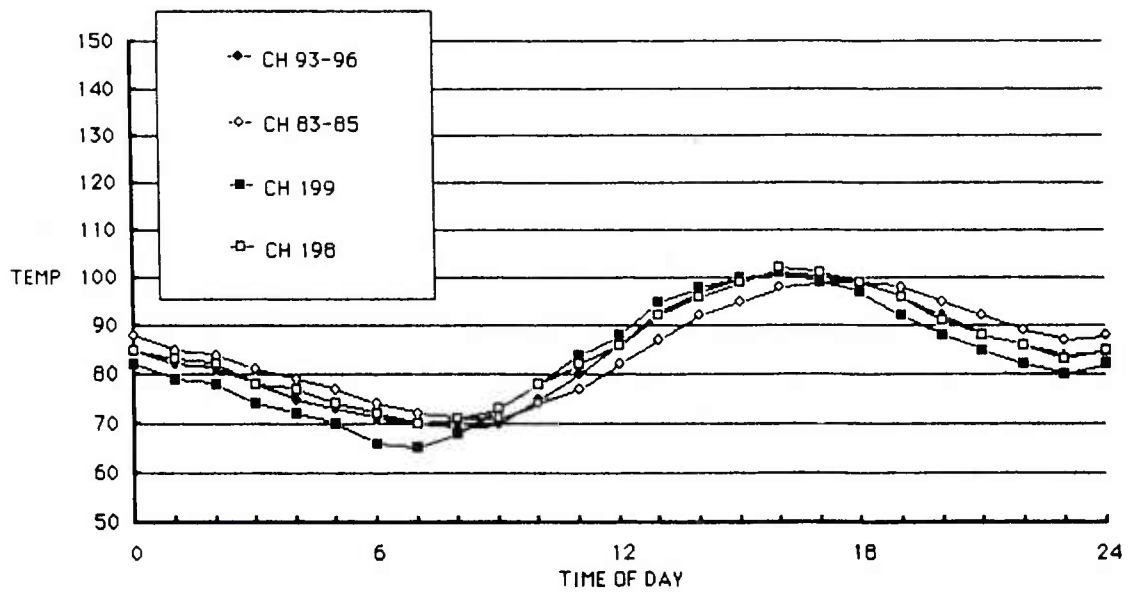


FIGURE D-3. Sidewinder in Container; Channels 93-96, 92, 83-85, 199, and 198.

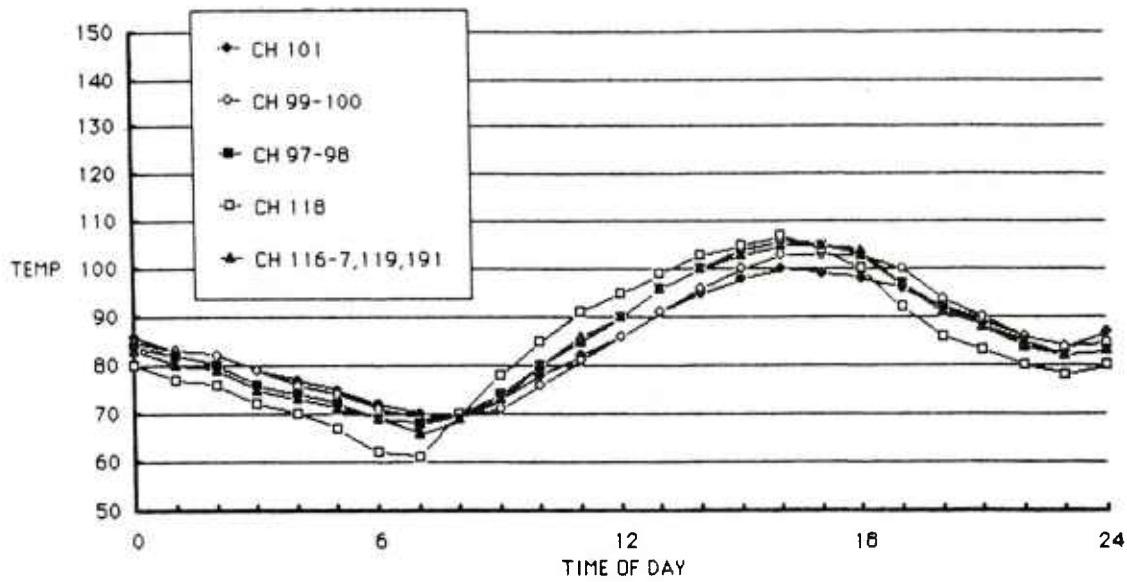


FIGURE D-4. Shrike in Container; Channels 101, 99-100, 97-98, 118, and 116-117, 119, and 191.

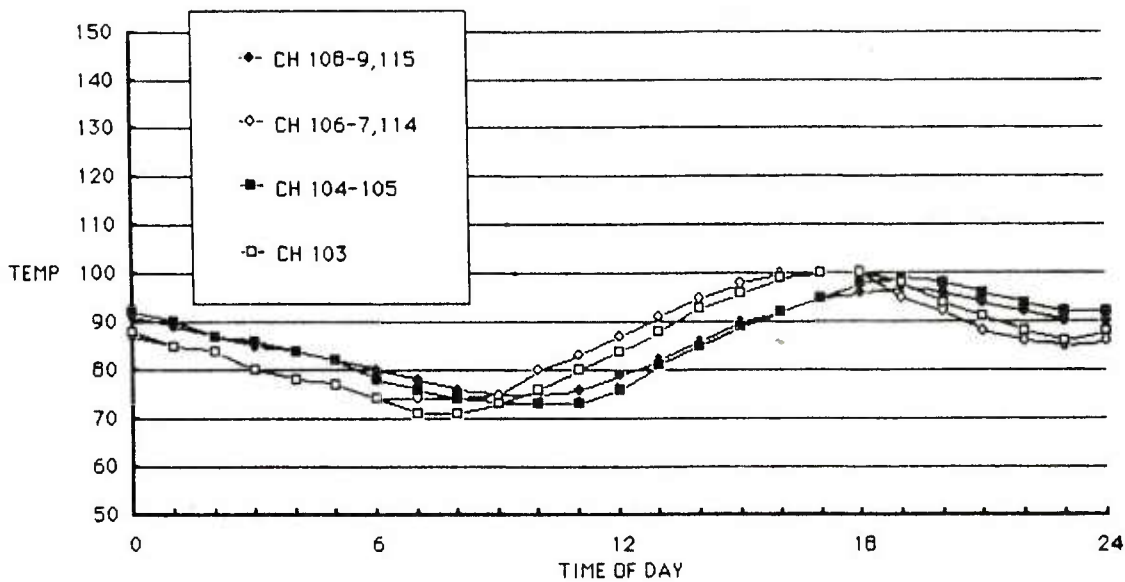


FIGURE D-5. Shrike in Container; Channels 108-109 and 115, 106-107 and 114, 104-105, and 103.

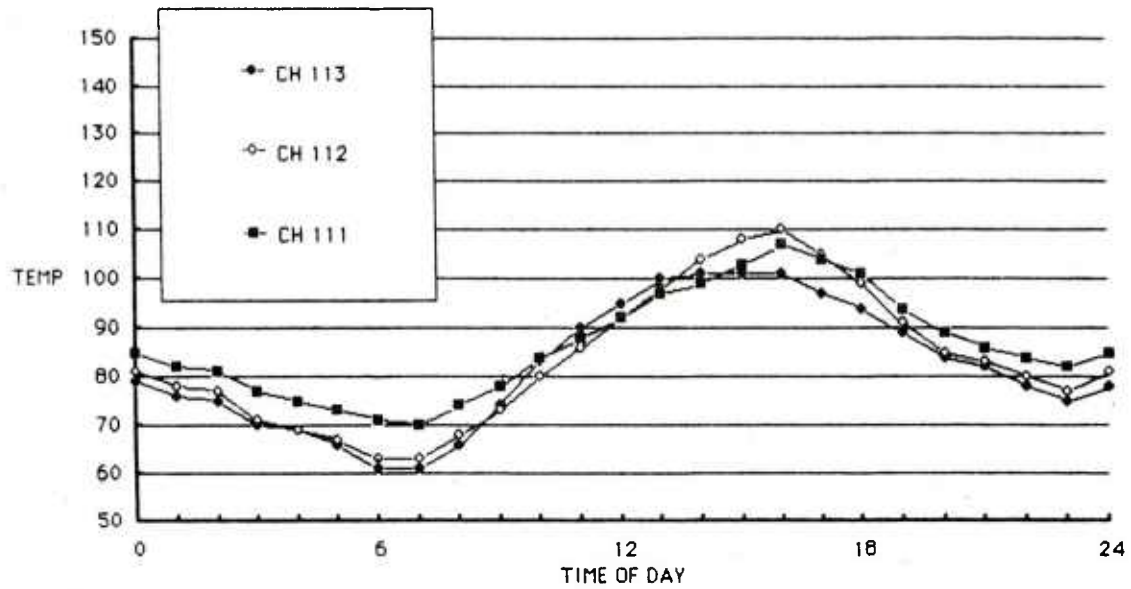


FIGURE D-6. Shrike in Container; Channels 113, 112, and 111

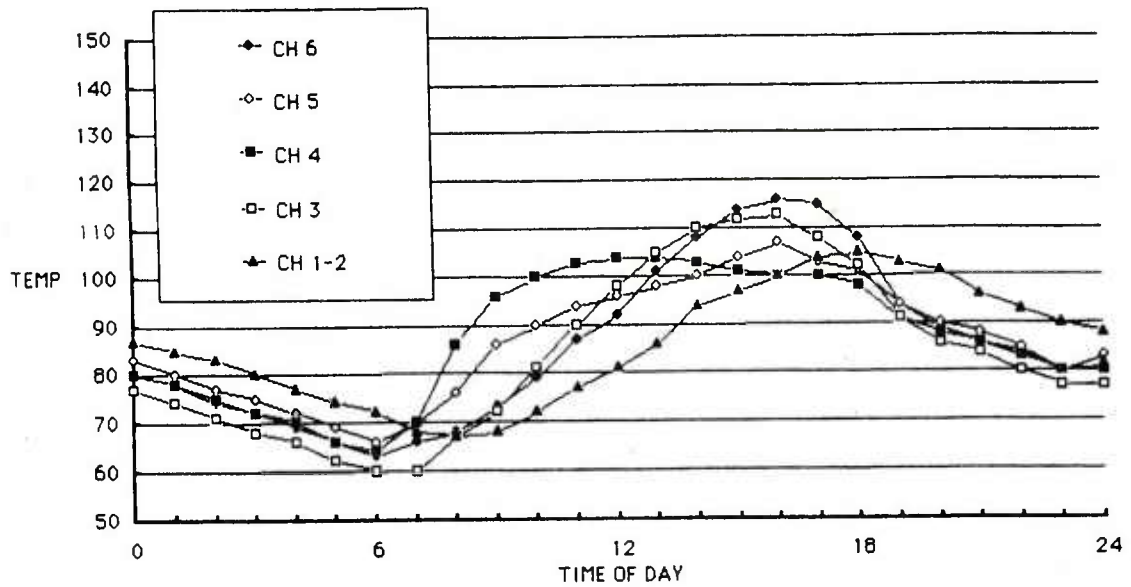


FIGURE D-7. Thermal Standard, Channels 6, 5, 4, 3, and 1-2.

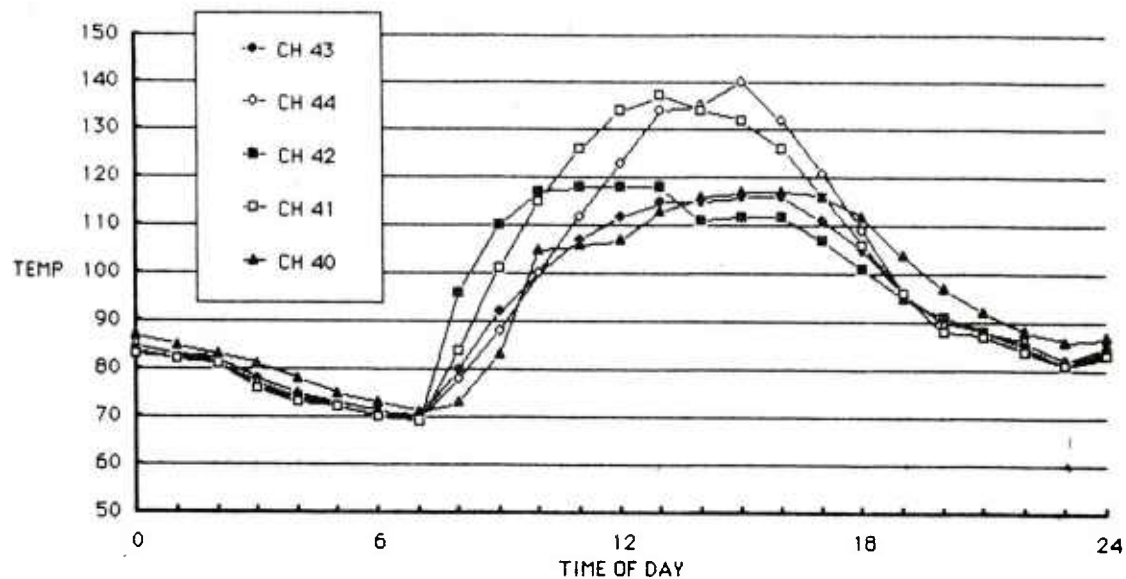


FIGURE D-8. Thermal Standard (60-inch), Channels 43, 44, 42, 41, and 40.

TABLE D-1. Data Channels, 11 September 1974 Tests of Shrike.

| Data channel | TC | Missile section | Location |
|--------------|----|------------------|----------|
| 1 | | Thermal standard | |
| 2 | | Thermal standard | |
| 3 | | Thermal standard | |
| 4 | | Thermal standard | |
| 5 | | Thermal standard | |
| 6 | | Thermal standard | |
| 7 | | Sidewinder | |
| 8 | | Sidewinder | |
| 9 | | Sidewinder | |
| 10 | | Sidewinder | |
| 11 | | Sidewinder | |
| 12 | | Sidewinder | |

TABLE D-1. (Contd.)

| Data channel | TC | Missile section | Location |
|--------------|----|--------------------------|-------------------------------------------|
| 40 | | Thermal standard | |
| 41 | | Thermal standard | |
| 42 | | Thermal standard | |
| 43 | | Thermal standard | |
| 44 | | Thermal standard | |
| 70 | | Sand surface | |
| 83 | 30 | Sidewinder warhead | Top inside surface of case |
| 84 | 31 | Sidewinder warhead | West outside surface, grain |
| | 32 | | Bottom surface, grain |
| 85 | 33 | Sidewinder warhead | Top outside surface, grain |
| | 34 | | East inside surface, grain |
| | 35 | | East outside surface, grain |
| | 36 | | Bottom inside surface, grain |
| 92 | 41 | Sidewinder motor | Center |
| | 42 | | Inside motor, 1 1/4 inches from top |
| | 43 | | Inside motor, 1 1/4 inches from east side |
| 93 | 47 | Sidewinder motor | Bottom outside surface |
| 94 | 45 | Sidewinder motor | Top surface |
| 95 | 46 | Sidewinder motor | East outside surface |
| 96 | 48 | Sidewinder motor | East outside surface |
| | 44 | | Inside motor, 1 1/4 inches from west side |
| 97 | 7 | Shrike guidance computer | Outside skin: top |
| | 8 | | west side |
| | 9 | | bottom) |
| 98 | 21 | Shrike guidance computer | West antenna fuze: outside surface |
| | 22 | | center |
| 99 | 18 | Shrike guidance computer | Forward center, aluminum surface |
| | 19 | | East antenna fuze, outside surface |
| | 20 | | East antenna fuze, center |
| 100 | 11 | Shrike guidance computer | Center module skin: top |
| | 12 | | west |
| | 13 | | bottom |
| | 14 | | east |
| | 15 | | Bottom east module bolt |
| | 16 | | Center air, fourth module from aft |
| | 17 | | Aft center on aluminum |
| 101 | 33 | Shrike control | Top outside skin, aluminum |

TABLE D-1. (Contd.)

| Data channel | TC | Missile section | Location |
|--------------|------|------------------|----------------------------------------------|
| 103 | 24 | Shrike warhead | Outside skin: 1:30 west |
| | 25 | | Outside skin, 4:30 west |
| | 26 | | Outside skin, 7:30 east |
| | 27 | | Inside, 1 7/8 inches from center: 10:30 east |
| 104 | 28 | Shrike warhead | Inside, 1 7/8 inches from center: 1:30 west |
| | 29 | | 4:30 west |
| | 30 | | 7:30 west |
| | 31 | | Inside center |
| 105 | 32 | Shrike warhead | Inside center |
| 106 | 38 | Shrike motor | Top outside skin, slightly east |
| | 39 | | Outside skin, east side |
| 107 | 41 | Shrike motor | Outside skin, west side |
| 108 | 43 | Shrike motor | Inside, 1 7/8 inches from center: top |
| | 44 | | east |
| | 45 | | bottom |
| 109 | 46 | Shrike motor | Inside center |
| 111 | | Shrike container | Bottom |
| 112 | | Shrike container | West side |
| 113 | | Shrike container | Top |
| 114 | 40 | Shrike motor | Outside skin, bottom |
| 115 | 42 | Shrike motor | Inside, 1 7/8 inchs from center, west |
| 116 | 4, 5 | Strike guidance | Inside center antenna RF (aluminum rod, air) |
| 117 | 3 | Strike guidance | Center surface antenna (nonmetal) |
| 118 | 1 | Strike guidance | Top outside skin (nonmetal) |
| 119 | 6 | Strike guidance | Aft center RF antenna on aluminum surface |
| 191 | 2 | Strike guidance | Top outside skin, aluminum |
| 198 | 22 | Sidewinder TDD | Bottom outside surface (nonmetal) |
| 199 | 23 | Sidewinder TDD | Top outside surface (nonmetal) |
| | 20 | | West outside surface (nometal) |
| | 21 | | East outside surface (nonmetal) |

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